8.

REPORT

—OF—

JOHN S. SUDLER, OF SOMERSET COUNTY,

—AND—

RICHARD T. BROWNING, OF GARRETT COUNTY,

—THE—

COMMISSIONERS OF FISHERIES

—OF—

MARYLAND

—FOR—

1892 and 1893.

ANNAPOLIS:
KING BROS., STATE PRINTERS.
1894.

LIST OF FISH COMMISSIONERS OF MARYLAND.

Western Shore—	Eastern Shore—
1874–1875.....T. B Ferguson.	Philip W. Downes.
1876–1877..... "	"
1878–1879..... "	Thomas Hughlett, Sr.
1880–1881..... "	"
1882–1883..... "	"
1884–1885 .....G. W. Delawder.	Dr. E. W. Humphreys.
1886–1887..... "	"
1888–1889..... "	Stephen P. Toadvin.
1890–1891..... "	Granville R. Rider.
1892–1893.....Richard T. Browning.	John S. Sudler.

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REPORT.

To his Excellency, FRANK BROWN,

Governor of Maryland.

SIR:

We have the honor to submit, herewith, our report on the Fish and Fisheries of Maryland, and of the work accomplished by us, for the two years of our administration, ending December 31, 1893, as required by Section 87, Article XXXIX, of the Code of Maryland, with such suggestions as have presented themselves to us, in the performance of the duties prescribed by the act of 1876, chapter 47, as amended by chapter 497, of the session of 1888, for the protection and propagation of food-fishes in the waters of this State, as the result of that observation and experience.

The question of fish propagation and culture, until the last decade or two, received but little attention, except in a few States, when a movement was inaugurated by Congress in the passage of a resolution, which was approved February 9, 1871 (16 Stats., 593), establishing the United States Fish Commission, the primary object of which was simply for the purpose of "ascertaining whether any and what diminution in the number of the food-fishes of the coast and the lakes of the United States had taken place; and if so, to what causes the same is due; and also whether any and what protective, prohibitory, or precautionary measures should be adopted in the premises."

(See Section 4396 of the Revised Statutes of the United States.)

This investigation was made under the supervision and direction of Professor Spencer F. Baird, of the Smithsonian Institution, who was appointed the first Commissioner of the United States, and held that important office from its establishment, in 1871, until his death, which occurred at Wood's Holl, Massachusetts, in the summer of 1887.

So impressed was Congress with the results of the investigation made by Professor Baird into the condition of the Fisheries of the country, that, in 1872, it

made an appropriation of $15,000 "for the introduction of shad into the waters of the Pacific States, the Gulf States, and of the Mississippi valley, and of salmon, whitefish and other useful food-fishes, into the waters of the United States to which they were best adapted, * * * under the direction of the United States Commissioner of Fish and Fisheries." (17 Stats., 350.)

This action and investigation attracted the attention of the whole country—which demonstrated beyond question the fact that the number and quality of the food-fishes of the coast and of the lakes were rapidly diminishing and deteriorating.

The same results were subsequently shown whenever these investigations were made, so that increased appropriations were made by Congress from time to time.

Under the wise and masterly management of Professor Baird, this work, proceeding from a simple inquiry in 1871, with an appropriation of $15,000 in 1872, had developed into the production, transportation and distribution, at the time of his death, a period of seventeen years, of over 100,000,000 young fish, and the administration of sixteen hatching and rearing stations; two in Maine, at Grand Lake Stream and Bucksport; two in Massachusetts, at Gloucester and Wood's Holl; two in Michigan, at Northville and Alpena; one at Duluth; one on the Columbia river in the North West; two in California, on the Sacramento; three in Maryland, one on the Susquehanna, at Havre de Grace, another at the mouth of the Potomac, at St. Jerome, and the other at Fort Washington; two within the City of Washington and one at Wytheville in Virginia; besides the administration of scientific investigations and fish hatching done by three steam and one sailing vessel, and of three transportation cars, specially designed to transfer fish from one part of the country to another.

After his death, Congress, by its first act in 1888, so amended the law of 1871, as set forth in section 4395 of the Revised Statutes of the United States, authorizing the appointment of a person of scientific and practical acquaintance with the fish and fisheries, as to make said commissioner a *salaried* officer, whose sole duty should be confined to the work of the Fish Commission. (25 Stats., p. 1.) Col. Marshall McDonald, the inventor of the McDonald fish-way, was appointed the

Commissioner of Fish and Fisheries under said law, and has proven himself a most worthy successor of the lamented Baird, and maintains the high reputation of the commission for its scientific research and usefulness.

This interest has so rapidly developed and spread, since the establishment of the United States Fish Commission, that there are to-day only five States in the Union that have not been or are not represented by its Fish Commissioners, viz.: Idaho, Louisiana, Mississippi, Montana and South Dakota; and some of these, if not all, no doubt will fall into line in the near future and become among the foremost in the development of so valuable a food-product to the masses.

Realizing the fact of the deterioration of her fisheries, a vast resource of food-supply for her people being yearly diminished from cause within the reach of legislation, and observing a further fact that the experience of many of her sister States had shown that their depleted fisheries could be fully restored by the proper propagation and culture of fish, and to that end had appointed commissioners to take charge of the propagation of their food-fishes and to look after their protection while so young and helpless, and being invited by the Congress of the United States to confer with the United States Fish Commissioner, who was always prompt and willing to co-operate with the Commissioners of the several States in furnishing such aid and information as might be useful in assisting them in the stocking of the waters of the State with suitable food-fishes (as may be seen from the preamble to the act of the statute hereinafter cited), Maryland readily fell into line in 1874, and by prompt legislation authorized the appointment of two Commissioners of Fisheries, one for each shore of the State, to inspect all the waters of the State, with a view to their adaptation to the stocking them with food-fishes; to examine into the feasibility of constructing fish-ways or fish-ladders to admit the passage of fish over dams and other obstructions; and to select proper locations for the proper propagation and culture of such food-fishes as it might be desirable to introduce into the waters of Maryland, and to erect suitable houses and devices for hatching ova and protecting the small fish until fit to be distributed in the waters of the State, for which they were adapted.

Fish-culture, doubtless, as a means of restoring the

native fish to their original number and quality, in its development, has come to be the principal agency for maintaining and upholding so important an industry in this State, though much must depend upon the legislation of the State in controlling and governing the means used to trap and catch the fish when mature; for it has been clearly demonstrated that there has been, up to this period, a decided and continuous diminution of the food-fishes of this State, and that the most potential factor in bringing about this deterioration has been the multiplication of traps, pound nets, gill nets, seines and other devices for catching them. Another hindrance or drawback has been the absence of any restriction upon the season as well as upon the methods of fishing, and the obstruction of streams by means of impassable dams.

When we consider how many appliances have been devised and are being used to entrap these food-fishes on their way to their spawning grounds, there is no wonder that so few succeed in reaching them. For this reason their reproduction by this natural source has long since ceased to be depended upon as a material factor in determining the conditions affecting our fisheries, especially those of our luscious shad, the prince of all food-fishes, and of our modest herring, the food-fish of the masses.

The remedy must be found in the proper regulation of the fishing, and must be dependent on systematic, regular and rational methods of propagation, based upon the careful study of the environments and habits of the fishes and the conduct of fish-culture operations.

Preparatory, therefore, to the performance of the duties required of the commissioners in the work of propagation, we have examined the laws regulating the taking or catching of fish in the State, as set forth in the Code of Public General and Local Laws of the State, and in subsequent legislation upon the subject, since the adoption of the Code in 1888; we have, with very great interest, read the several reports of our predecessors, which set forth the valuable contributions they have made from year to year in promoting and extending an industry so vital in its resources to the State of Maryland.

At one time Maryland boasted of the excellent quality of her fish as a food-supply.

She was then known as the most largely interested commercially of any State in the Union in her fish-

products. It is prophetic that she aims to re-establish herself once more on that vantage ground.

Each commissioner, in his respective territory, and, at times, together, has visited each of the hatching stations, which have been erected or secured by our predecessors for the propagation of shad, herring and trout, most of which are equipped with the McDonald jars for propagation. The station, on Tuckahoe river, near Coward's Point, Caroline county, known as the "Choptank" station, was established in 1879, by Col. Thomas Hughlett, Sr., ex-commissioner, and supplies the waters of Caroline, Queen Anne's, Kent and Cecil counties, with the young fry shad and perch. It is a substantial wooden-building on piles, built by Dr. Humphreys in 1885. The Seth Green box was introduced in 1879 for propagation, which has a cant motion, and generally used where there is a swell, but as the waters here are generally smooth, the Wroten box was substituted in 1888, and is now used here exclusively, and too much cannot be said in its praise.

The station at Triford's Mills, near Sharptown, Wicomico county, on a branch of the Nanticoke river, is known as the "Nanticoke" station, and supplies the waters of Dorchester, parts of Caroline and Wicomico counties, with young shad, perch and herring.

This station was built in 1884, just below Triford's Mill, and is nearly the central point of the fresh water fishing grounds of the Nanticoke river. The water, which is pure and inexhaustible, is carried through pipes from the dam of the mill to the hatching house, which stands below the dam, giving a fall of four or five feet.

The station at Salisbury, the headwaters of the Wicomico river, is supplied from the pure clean water from the millpond belonging to the Hon. Thomas Humphreys, and is built upon the site of an old sawmill attached to the Locust Grove flour-mills. This station is known as the "Wicomico" station, and supplies the waters of portions of Wicomico, Somerset and Worcester counties, with shad, herring and perch.

The station at Druid Hill Park, Baltimore, was established in 1875. The city of Baltimore, by act of May 11, 1875, appropriated $5000 for the purpose, and requested the Park Commissioners to erect a hatching house and construct ponds for breeding, rearing and exhibiting fish in the Park. George A. Frederick, architect, designed the building for a wooden struc-

ture, but the Park Commissioners decided that only a stone structure would be in unison with the surroundings of the locality, which necessitated a considerable increase of expenditure, which the Park Commissioners provided out of their funds. The trout ponds were designed and constructed by August Faul, the Park engineer, and they were, at the time, models of completeness. The State of Maryland, in connection with the United States Fish Commission, furnished it with the needful appliances for hatching fish of all kinds. The house was in charge of the United States Fish Commissioner from the time it was built. The United States built the carp ponds, and placed therein all the imported carp. Subsequently the Park Commissioners placed the hatchery and ponds under the exclusive control of the Maryland Fish Commission. When they took charge, all the apparatus for hatching purposes that could be detached had been removed and taken to Washington, leaving nothing for the State Commission except an empty house. It is still, with the ponds, in the possession of the State Fish Commission, and has been for the past few years, and is now appropriated to the hatching of the various kinds of trout, and of the ova of shad procured from Havre de Grace, on the Susquehanna, which are distributed in the brooks and water-courses of the Western Shore.

This station was visited by the Commissioner for the Western Shore first, on the 26th of April, 1892, when very little was found belonging to the State—only a few hatching jars and boxes, of small value. At the request of the Park Commissioners and city authorities, repairs on this station have been made by him from time to time.

The Havre de Grace station was visited April 27, 1892, and its condition was very similar to that of the Druid Hill hatchery. The only State property at the station consisted of a few hatching jars, six sheet-iron tanks, some iron-pipe, and a six-gallon egg-basket, the value of which was only nominal, and of no service for advanced means of propagation. Owing to the poor equipment of this station, and the advanced season, leaving no time to place it in condition for hatching purposes, the ova of the shad collected there was shipped to the Druid Hill Park hatchery and thence hatched and distributed.

These several stations we found had been under the superintendence of gentlemen who had given con

siderable time and attention as well as research to the habits and haunts of the choicest food-fishes, and to the several methods of procuring spawn and impregnating it and were practically well drilled in the details for the propagation and culture of such food-fishes as had been found best adapted to the waters of Maryland. So successful had been the operations of former Fish Commissioners, under the care and supervision of these gentlemen that we felt ourselves fortunate in being able to secure their services and experience in aiding us in the prosecution of the work under our superintendence.

Mr. Thomas Hughlett Jr., has had charge of the Choptank Station and has been connected with the Fish Commission, we understand, from its organization, Mr. Walter C. Mann, has had charge of the Nanticoke Station, Mr. Sylvanus Trader has been in charge of the Wicomico Station and Messrs W. T. Wroten and Lloyd W. Delawder have had charge of the Druid Hill Park Station.

These gentlemen have had several years experience at their respective stations and have shown themselves to be not only practical and efficient, taking great interest in their work, but their success, from year to year, furnished the strongest evidence that better men for the service could not be found in the *personnel* of any of the several State Fisheries of the Country, and we regret that the appropriation, at our disposal, is such as to preclude us from allowing them salaries somewhat more commensurate with their known worth, ability and fidelity.

They have been unexceptionally efficient in the collection of ova and in the performance of the several duties connected with their respective hatching stations and we take very great pleasure in commending their several reports for the years 1892 and 1893 to your favorable attention. (See Appendix "A.")

It will be seen from these reports that there were secured at the Tuckahoe or Choptank Station, in April and May, 1892, under the supervision of Mr. Hughlett 858 shad, from the spawn of which 21,450,000 eggs were obtained, and 14,000,000 young shad were distributed in June, 1892, in the waters of Dorchester, Caroline, Talbot, Queen Anne's, Kent and Cecil counties. There were secured at the Sharptown or Nanticoke Station, by Mr. Mann 219 shad, from which 5,475 000 eggs were obtained, and 5,100,000 young shad dis-

tributed in the Chickananiconixco and Nanticoke rivers. Besides this distribution of shad Mr. Mann distributed in Plumb Creek and in the Nanticoke river the same season 7,300,000 young herring and 650,000 young perch.

There were secured at the Salisbury Station, on Wicomico river, by Mr. Trader 154 shad, from which 3,850,000 eggs were obtained and 3,165,000 young shad distributed in the Wicomico, Pocomoke, Annamessex and Manokin rivers and their tributaries.

From the Druid Hill Park Station there were distributed in the several streams of Western Maryland 49,800 trout, 2,650 carp, and 26,500,000 young shad, the largest number of shad ever distributed from this station in any one season.

In 1893 Mr. Hughlett succeeded in obtaining 1,640 ripe shad, the largest supply ever handled in one season at any station, from which 41,000,000 eggs were impregnated and 24,625,000 young shad hatched and distributed in the waters of Dorchester, Talbot, Caroline, Queen Anne, Kent and Cecil counties. Besides these he distributed 3,600 carp in waters of Dorchester county.

Mr. Mann, this year, from the 267 ripe shad obtained, impregnated 6,675,000 eggs, from which he hatched and distributed 6,075,000 young shad in the waters of the Nanticoke river and its tributaries, viz: Plumb Creek, Laurel river, Marsh Hope and Barren Creeks.

Mr. Trader, of the Salisbury or Wicomico Station, secured 300 ripe shad, from which he obtained 7,500,000 eggs, and therefrom hatched and distributed 7,125,000 young shad, in Wicomico, Pocomoke, Manokin and St. Martin's rivers, and in Tony-tank, Passadyke, Quantico and Back creeks, together with 200,000 young shad furnished to the Virginia Commission. Besides these he distributed 455 carp in waters of Somerset and Wicomico counties.

Mr. Delawder, of the Druid Hill Park Station, hatched and distributed 2,250 carp, 189,600 trout, (38,000 of which were rainbow trout), including 75,600 trout distributed by Commissioner Browning, all of which were distributed in the streams and brooks of Western Maryland; also 12,500,000 young shad distributed in the Patapsco and Back rivers.

The total distribution of fish by the Commissioners for the year 1892, was 48,765,000 young shad, 7,300,000 young herring, 650,000 young perch, 49,800 young trout.

and 2,650 carp; and for the year 1893, there were distributed 50,325,000 young shad, 6,305 carp, and 38,000 rainbow and 151,600 brook trout, making a total distribution for the two years of our administration of 99,090,000 young shad, 7,300,000 young herring, 650,000 young perch, 239,400 young trout and 8,955 young carp, aggregating a grand total of 107,288,355 fish of all kinds.

Fifty thousand trout were placed in Lake Brown, a new site in Garrett County, for trout propagation, selected by reason of the unsatisfactory condition of affairs at Havre de Grace and Druid Hill Park Stations.

It was deemed advisable to seek elsewhere a proper site, where trout could be propagated in the mountain streams, their native element.

After much consultation and mature reflection, a suitable site was selected at the "narrows of Deep Creek" in Garrett County, about one mile from Lake Cleveland, owned by Hon. G. W. Delawder Ex-Fish Commissioner. This site was subsequently visited by the Commissioner from the Eastern Shore, who heartily approved of the change, and all of the plans adopted, and pronounced the location, as did others, the finest in the State for the purpose.

At this point an artificial lake has been constructed, which is about a mile and a half in length and about 300 yards wide. The land necessary for the lake and the hatching establishment, has been leased for the State for a term of fifteen years, with the privilege of purchase at the expiration of the lease, if it then be the pleasure of the Governor and the Legislature to avail themselves thereof. The land has been secured and the Lake constructed the present year at a cost of about seven hundred dollars. The hatching house is being constructed, but can not be completed in time for the Fall work. The whole outfit is the property of the State, and while it is thoroughly adapted to the propagation of brook trout, it may also be utilized by the citizens of the State, who may desire to avail themselves of its privileges, furnishing, as it will, in our opinion, one of the finest trout fisheries on the American Continent.

From the great influx of persons from other parts of the State, and from distant cities, who annually visit Lake Cleveland on fishing excursions; we are convinced that the construction of the new lake, owned by the State, christened with a name, that will ever be honored by all Marylanders, with its hatchery, will do

more to popularize the work of the Fish Commissioners and the propagation and culture of brook trout, with the people of Western Maryland than anything this or former commissioners have ever done in that behalf.

Any Marylander who shall ever enjoy the pleasure and privilege of fishing upon Lake Brown, must acknowledge the judicious expenditure of the State's money, and that here at least he can reap pleasing evidence that the State has something to give in return for the expenditure made.

Attention is invited to an appeal made by the Fish Commission of Pennsylvania, in their annual report for 1888 to 1891, (p. 5), to the Maryland Fish Commissioners to suppress those devices that act against the best interests of both States in retarding the progress of fish propagation, and which emasculate the efforts of the United States and Pennsylvania Commissions in stocking the Susquehanna with fish that are destroyed in its lower reaches by nuisances that are practically legalized by Maryland; alleging that if the Susquehanna is again to be made as great a shad producing river as the Delaware, the *fish baskets*, that destroy the young shad on their passage down to the sea, should be thoroughly eradicated. The appeal is made that prompt measures be taken to abolish these fish baskets that are so prejudicial to the fish producing interests of both States; for the Susquehanna, like the Delaware river, is the temporary home of the young fish, that, when mature, fill every inlet and estuary of the Chesapeake; that if the number of these fish are lessened in the future by the said causes, as they have been decreased in the past few years, the shad fisheries of Maryland, as well as those of the Susquehanna, will soon cease, they allege, to be productive.

The manifest decrease of the supply of fish furnished by the Susquehanna, having aroused public attention in 1866, a convention met in Harrisburg to consider the cause thereof, when an act was prepared requiring fishways to be constructed in all the dams upon the Susquehanna and its tributaries, which became a law March 30, 1866, and large sums of money were appropriated and used by that State from year to year, for the construction of fish-ways at certain points on said river and tributaries—the Rogers' fish-ways, a simple, durable, efficient and comparatively inexpensive Nova Scotian invention, having been adopted by the State

in 1885, so that it is now in contemplation to supply all dams in that State with these fish-ways. It is as little as Maryland could do, in our opinion, to lend its aid as has been suggested, in protecting the young fish in their seaward course.

While it is true that only fourteen miles of the waters of the Susquehanna flow through the State of Maryland into the Chesapeake Bay, yet it is a courtesy that one State should extend to another not to place knowingly any impediment in the way of that State, in its endeavor to utilize that portion of the waters of the Susquehanna and its tributaries, that cover an extent of six hundred and thirty-five miles, within its limits, by permitting such nuisances to continue as have been complained of, and as "practically legalized by Maryland" as they believe and affirm.

It must be remembered that the shad and other anadromous food-fishes must traverse the Maryland portion of the Susquehanna to reach their natural spawning grounds that lie within the limits of the State of Pennsylvania; that it is true that the spawning grounds of these food-fishes within the Maryland portion of said river are comprised within a very limited compass, wholly inadequate to the requirements of these fishes, and it is now a well established theory that these food-fishes will not return to waters so deficient in spawning area. It is well, therefore, to remember, in considering this subject in its relation to the benefits to accrue to Pennsylvania that Maryland too has an equal, if not greater interest in the enlargement of the spawning grounds of the shad, for as these are increased in the same ratio, may we anticipate an increased supply of the matured fish. We therefore respectfully recommend that the attention of the Legislature be invited to this particular subject, and that proper laws be enacted for the suppression of the nuisance complained of, by prohibiting, with penalties, the construction or use of any such fish baskets in the waters of the Susquehanna, within this State, at any season of the year.

We heartily concur in the views of the Pennsylvania Commissioners who declare that

"The deadly fish-basket has played its part in the wanton destruction of fishes of nearly every kind, and is worthy of the most severe condemnation. Its long arms or wings of stone reaching from the basket in or near the middle of the stream, in an upward direction on either side towards the shores, gather in every living creature carried by the current.

A slight blow that will displace a scale will cause the death of these delicate little fish, and scarcely a young shad which succeeds in passing through the slats of the basket will live, while millions are caught upon the basket and there left to die."

On the subject of fish-ways, Major T. B. Ferguson, in his report for the year 1880, page XII. writes:— "Having demonstrated the efficiency of the means employed to increase the yield of shad and other migratory fishes, it has now become essential to the thorough success of the work and for the distribution of its benefits to all parts of the State, that means be provided for the ascent of fish to localities from which they are now debarred by natural and artificial obstructions. Although there are no such obstructions in the Susquehanna within the limits of this State, yet the work of restocking the river proper, and of increasing the supply of fish at its mouth, would be very materially assisted by opening the river to its sources, as this would not only enlarge the spawning grounds to a proportionate and very considerable extent, but would at the same time, afford more and better opportunities for the capture of ripe fish.

The construction of proper fish-ways in the river, in Pennsylvania, and the discontinuance of the use of fish-weirs along the entire length of the river would very quickly yield the best results to the citizens of both States."

Fish are no longer looked upon as spontaneous and inexhaustible products of the waters, and the desire for their protection, that they may be tributary to our comfort and a never failing means of supply, has been the subject of more thoughtful consideration than ever heretofore. Thus, hand-in-hand with fish culture, should come intelligent and systematic protection, so necessary for its success.

The full results can never be derived from the artificial propagation of our food-fishes, unless aided by legislative protection. In 1874, when the Fish Commission was organized in Maryland, there was not a single person in the State who had ever taken or artificially hatched shad eggs, but there are to-day many men trained by the several Commissioners in the manipulation of shad and other fishes, who are as expert as any in the Country. We have not hitherto felt justified in promising to do more by artificial propagation, than simply to avert the alarming decrease in the yield of the fisheries of the State. But from

the results already obtained, we are now confident of our ability to render the waters of Maryland as productive of the more useful native varieties of food-fishes, especially perch, as they have ever been.

It has been ascertained that shad generally spawn at night, after eight o'clock. They select shallow water, and in pairs, male and female running side by side come suddenly out of the water as the female deposits her spawn, and the male ejects upon it the milt. We trust that our fishermen, for their own protection, in the absence of positive and necessary legislation will avoid as far as possible a further indiscriminate destruction of fish, by ceasing to fish at night, and employ the means in their power to check the decrease, which has heretofore been so apparent.

In order to secure the active co-operation of the gill net fishermen, the United States Fish Commissioner, for several years generously paid to the gillers fifty cents for each ripe female shad delivered immediately as it was taken from the net, the fish being invariably returned to the fishermen after the eggs had been taken. As the operation caused no perceptible injury to the fish, the money was a strong incentive to the co-operation of the fishermen, as it was a source of considerable revenue to them. In 1879 the price was reduced to twenty-five cents by the State Fish Commission, and that has remained the price paid ever since. We would here return our thanks to the gillers for the assistance which they have rendered our superintendents in promptly furnishing the ova from ripe fish immediately they are captured, and for the uniform courtesy which we have received at their hands.

We cannot recall a single case where they have not manifested the greatest interest in our work, all of whom seem to appreciate the future benefit which they are to derive from its results. We desire also to express our grateful acknowledgments to all those who have from time to time aided us with their information and experience in stocking our rivers and in other work connected with the commission, without whose aid we could not have accomplished so much with the means at our disposal.

The period in which shad-hatching operations can be profitably and successfully carried on in Maryland waters, is limited by the conditions and temperature of the water, to about eight weeks, extending from

the middle of April, the time when the first ripe fish are taken, until the tenth of June, when the fishing-season ceases by law.

The return of shad from the salt water to their native rivers, is for the sole purpose of reproduction, and therefore only the adult shad make their annual migration from the sea. Many convincing proofs of the certainty of the return of the migratory or anadromous fishes to the rivers in which they were hatched, sustain the theory on which our efforts to restock our waters are predicated. A salmon weighing fifteen pounds is on exhibit at the Smithsonian Institution in Washington, presented by the fishery officer of the Dominion of Canada, (Mr. Wilmot) showing two readily recognized marks, made evidently with a conductor's punch, one in the second or adipose dorsal fin and the other in the tail or caudal fin. This fish was so marked by Mr. Wilmot the first year by punching a hole in the adipose dorsal, the second season or year a similar hole was punched in the caudal fin showing that Mr. Wilmot had handled it two seasons and that it was finally captured in a net, near the mouth of the creek where it was propagated. Col. McDonald gives an interesting account of planting shad in California waters stating that they had appeared in rivers where none had been placed; that snow would retard the run of shad and warm rain would hasten it, the temperature of the water having much to do with the movements of fish.

In making a statement in regard to the general increase of shad in the waters of the country, he said that although they had diminished in some waters, there was a general increase in the fisheries South of New England. It was a curious fact, he related, that when shad were numerous in the Chesapeake they fell off in the Delaware, and vice versa. This has not been accounted for, nor has it been determined why some streams no longer furnish the quantity of food fishes that they did in former years.

We have realized that water is not the only essential to the successful cultivation of fish; that food fish will not thrive where there is no fish food, and it may be that these very streams need stocking first with fish food rather than with food fish. There are waters apparently well adapted to one class of food fishes which are detrimental to another class. In such cases we must have recourse to scientific experiment, under-

taken by the Government or by the State, to discover and determine not only the actual cause of these things, but to furnish definite information on which remedial measures may be based.

It would not be practical wisdom, for instance, to put carp, in superior waters where trout could be made to prosper and abound, nor would it be wise to place trout in inferior waters, whose stagnant condition rendered them suited only to the lowest types of fish—for failure would inevitably follow.

That the highest and best practical results may be reached in the propagation, culture and distribution of the food-fishes of the waters of Maryland, it is essential that one should become better acquainted with the breeding habits of the several species, the spawning grounds and seasons, the character and number of the eggs, the manner in which the latter may be most successfully fecundated and incubated artificially, the duration of the period of incubation, the length of time the embryo should be kept in captivity, the kind of food adapted to the young, and the proper localities for its planting, where it may find not simply nourishment, but freedom from its enemies. This information and these facts we have endeavored to obtain from time to time through Col. McDonald, United States Fish Commissioner, and his capable corps of assistants, and as far as possible to put the same into practical operation.

Instead of having our own force engaged with seines in procuring ripe shad and herring, we have adopted the better and more economical method of securing them from the fishermen direct, all of whom concur in the plan, so that when a ripe shad is taken by them, they at once report it to our force, who are within reasonable distance, constantly on the watch with their apparatus, when the shad is stripped, the fisherman paid his bonus, and the fish returned to him. This spawn, when a sufficient quantity has been secured, is taken to the hatching station, where the eggs taken from the female are mixed with the milt from the male, and impregnation begins. When this is effected, the eggs separate of themselves, and are then placed in the McDonald-jars or troughs provided for the purpose, through which there is a constant, even and regular flow of pure water all the time. In a few days the hatching process will have been accomplished. In this manner a large percentage of the ova is saved, which,

if allowed to remain in the original deposit, would be destroyed. An average shad is estimated to yield 25,000 eggs, but one instance is given of a single shad taken from the Delaware river, June 4, 1888, from which a pan of eggs were taken, which, when placed in a jar and carefully measured, was found to contain 115,000. The experiment of rearing shad in ponds was introduced by Col. McDonald in 1887, at Wytheville Station, Virginia, the pond being fed by water drawn from Tate's Run, a small stream passing through the hatchery-grounds. He reports:

"In June of that year, I sent by messenger from Washington to Wytheville 40,000 shad fry, which were placed in the pond and left until the following October, when the pond was drawn, and we obtained, by count and estimate, 5000 shad from 3½ to 4½ inches in length, or about 12½ per cent. of the number placed in the pond originally. The conditions were by no means favorable, for about 2000 young carp 4 inches long were taken out with the shad, and the pond swarmed with "cyprinoids" which came in with the water supply. These fish are active and predaceous, and doubtless destroyed large numbers of shad."

The success of fish-culture everywhere has accomplished much in removing the prejudices of the communities bordering upon our rivers and streams. Those who were at first suspicious of the good results said to have been obtained, and who impeded the progress of the first Commissioners of the State, are to-day thoroughly convinced of the efficient work of the Fish Commission, and are our most efficient coadjutors, promptly lending their aid and co-operation in the advancement and maintenance of this valuable adjunct of their monetary resources, as is evidenced by a perusal of a few of the letters of fishermen, who have daily personal knowledge of what they write, which have been received and are herewith submitted in appendix "B."

This correspondence, giving a consensus of opinion of men most intimately connected with this industry, clearly demonstrates that without such aid from the State, shad-fishing would pass into history as one of its unprofitable and unproductive industries.

With this aid for a period of less than twenty years, such results have been averted; and it is an unquestioned fact to-day that there are more shad caught in the waters of Maryland than ever before, and from the statistics in hand, which appear in the appendix ("A"), we are satisfied that there are more men en-

gaged and capital invested in the fisheries of Maryland to-day than were ever known before.

This marked increase in the quantity of shad may be still further increased, in our opinion, by guarded general legislation, restricting and limiting the season when food-fishes may be caught.

Mr. George T. Mills, Fish Commissioner for the State of Vermont, in his report for 1892, commenting on this subject, held that

"The benefits accruing under the wise laws governing close seasons have a pronounced bearing, when we consider the magnitude of fish interests, as compared to the old laws, which were defective, vague and unproductive of the reforms contemplated by their enactment, * * hence, in embodying the reports of all States, I am fortified in the belief and statement that no State can well succeed in this industry without the co-operation of all good minded citizens and the enforcement of the law providing punishment and penalties for violations of same."

In a meeting of the Fish Commissioners of New England and others interested in fish culture, held in Boston, November 16, 1892, United States Commissioner McDonald, who was about to visit Gloucester, Mass., on official business, met said commissioners, and in presenting before them the policy of the United States Commission and its desire to co-operate with the State Commissioners, there stated that

"The great question to-day is how to regulate the fisheries so as to afford the protection needed, without harsh restraint, in taking fish for market. The policy of the commission has always been to improve and maintain a supply of fish for the market, and for this we cannot depend upon the hook and line alone—we must use the net. The question of how to regulate the net fisheries is an important one."

One has but to read the vast legislation enacted in this State for the benefit of the individual, the county, river, stream or particular fish, to be convinced of the reasoning of the Fish Commissioner for Vermont. We must make our fishery laws more general, and as far as possible abandon local legislation. Let there be not only a fixed time for the whole State when there shall be a close season for all kinds of food-fish, when no fishing whatever shall be allowed, but that when allowed that the means by which fish are caught shall be duly regulated by wholesome general legislation.

We therefore, in conclusion, respectfully urge upon our Legislature, through you, to bestow upon this in-

dustry the attention it most justly deserves, and that to meet its growing wants, and to increase the revenues of the fishermen, and thereby, the revenue of the State, we respectfully recommend that the appropriation heretofore annually made be continued, to enable the commissioners to give the necessary attention to, and supervision over, the propagation of other native food-fishes than shad and trout, for we are convinced that the propagation of commercial fish in the waters of Maryland belongs naturally to the State, whose interest in its success is paramount to that of the United States, whose province it is, and should be, simply to investigate the habits and haunts of these fish, and to ascertain the best methods of protecting them from their natural enemies, as well as to determine the best resources of their food-supply.

Your attention and that of the Legislature are invited to the work that has been accomplished under the Act of 1888, in the destruction of eels in Wicomico county, and the returns of sales made of eels and of the expenditure of the eel fund placed in our hands for that purpose. 74,082 eels were caught in 1892 at an expense of $1,866.41, and 96,604 eels were caught in 1893 at an expense of $2,066.57. Full details are given in our report to the Comptroller of the State, to which attention is respectfully invited.

As required by law, each commissioner has annually submitted to the Comptroller of the State a detailed statement of his receipts and expenditures of the money placed in his hands.

The Commissioners hereby jointly desire to express their appreciation of the interest taken in their work by the United States Commissioner of Fish and Fisheries and by his assistants, and for the prompt and cheerful manner in which they have always furnished us information and suggestions as to the best methods of conducting our work, and especially do we return our thanks to Mr. Herbert A. Gill, Chief Clerk and Acting Commissioner of Fish and Fisheries, and to Mr. H. M. Smith, Division Assistant, for the very valuable tables (see appendix "A") furnished by them, at our request, covering the fishery statistics of the State of Maryland, prepared under their supervision, viz.:

1. Table showing the number of persons employed in the fisheries of Maryland in 1891.

2. Table showing the apparatus and capital employed therein in 1891.

3. Table showing the products of the fisheries of Maryland in 1891.

4. Table showing the yield of the vessel fisheries of Maryland in 1891.

5. Table showing by apparatus the yield of the boat fisheries of the Eastern Shore of Maryland in 1891.

6. Table showing by apparatus the yield of the boat fisheries of the Western Shore of Maryland in 1891.

Also a list of the Fish Commissioners of the several States and Territories of the United States, and a list of the principal officers and superintendents of stations of the United States Fish Commission up to September 29, 1893 (see appendix "C"). Some of the States have made no returns to the United States Fish Commissioner for several years. We have taken the liberty to insert, in said list, the names of the last commissioners reported from said States, giving the year when so reported, to show that these States have not been unrepresented for the whole period since the organization of the United States Fish Commission, all of which appear in the appendix "C."

We hereby express our obligations to the gentlemen who have superintended the several hatching stations under our charge, and to the fishermen generally, who, notwithstanding their disposition formerly to ridicule scientific experiments and the increase of fish from artificial propagation, have since shown their sympathy with us by their conduct and their cordial endorsement of and co-operation in our work. It is a rare exception now that a fisherman can be found to decry this great work.

We desire to extend our thanks to the press of the State for the generous offers made to publish any matter in the furtherance of fish culture and its protection, or to secure and increase public interest in this important industry.

RECOMMENDATIONS.

Having presented our report of the work accomplished by us in as clear and forcible a manner as the limited space of an annual report would warrant, and having made such suggestions as have presented themselves to us in the performance of our duty as Fish Commissioners, in the propagation of food-fishes at the several hatching stations in the State, and having the past year investigated some of the methods

proposed to protect the young fry during its infant and helpless period, we have become convinced that measures for the protection of food-fishes must command fully as much of our attention as methods which tend to the advancement of increased propagation. Hand in hand with the restocking of waters must go the prevention of the wasteful capture of immature fish, or the work is almost as bad as thrown away. The State cannot afford to hatch and plant fish-fry to have them seized before they have half attained their growth, and when they are almost worthless for food. The only way to reap the full benefit of the work of fish culture is to prevent the taking or marketing of the fish until they have reached a reasonable maturity.

No valuable food-fish ought to be allowed to be taken or sold on the market until after it has reached an age to have cast its first crop of eggs, which means a growth of several years.

We believe it is becoming to be the opinion of a vast majority of the commercial fishermen that adequate and suitable laws should be enacted and enforced for the protection and judicious maintenance of the food fishes of the State, and that these laws should be such as to disturb as little as possible the investments of those engaged in the fish business that is consistent with the thorough and effective protection of our food-fishes.

We therefore recommend that there be

1. A careful revision of our laws for the judicious protection of our fish.

(*a*) That so far as feasible, special legislation not applicable to all waters of the State be discouraged.

(*b*) That a general law for the protection of trout be enacted fixing the size that might be lawfully taken from the waters of the State and sold in the market at six inches, and providing penalties for taking or having in possession trout of less size.

(*c*) That the size of the meshes of all nets and seines be fixed and limited by a general law.

(*d*) That fish-ways should be constructed at all points where the passage of fish is obstructed. Dams on the smaller streams should be required to be constructed so as to admit the free passage of all food-fishes.

2. That the emptying of sewage or any substance deleterious to the life of food-fishes should be, as far as practicable, prohibited.

3. That all fishing, except with hook and line, for a

fixed period in each and every year, should be forbidden.

4. That all small fish and others unfit for food because of immaturity, when taken in nets, weirs or seines, should be replaced in the water when taken alive, and that fishermen should not be allowed to take such fish ashore nor expose them for sale.

5. That all penalties fixed for violation of any laws that shall be enacted shall be made to apply not only to those who take the fish, but also to all persons who buy, sell, transport or have the same in possession.

6. That the destruction of young fish by improper means or modes of capture should be guardedly prohibited.

7. That a close season should be established, during which time all fishing with nets, seines or fixed apparatus should cease for thirty-six hours in each week, during the migration of anadromous fishes, that is from five o'clock Saturday afternoon until five o'clock Monday morning, in order that an opportunity may be given such fishes of reaching their spawning grounds, and when reached then to be permitted to remain undisturbed on their spawning beds. This close season should be vigorously watched and ample penalties should be imposed for any and every encroachment thereon, as this is universally believed to be one of the important steps towards the preservation of our best and most desirable food-fishes.

8. That the catching of fish in the waters of the State, by means of large haul seines, and the taking away by this means of large quantities of fish by non-residents, should be positively prohibited by Legislative enactment. Or, if allowed, a license tax should be imposed upon them of sufficient amount as virtually to suppress the depredation.

It has been settled that the States own the fish within tidal waters, so far as they can be the subject of property rights. Martin vs. Waddell, 16 Pet. 367, 410; Smith vs. Maryland, 18 Howard 71; McCready vs. Virginia, 94 U. S. 391; see also Vattel, book 1, Sections 234, 235, 246, 287; Wheaton Int. Law, part II, C. 4.

It was long ago held, by the highest and most respectable federal authority, save only the Supreme Court of the United States, that the right to share in the use and enjoyment of tidal waters, their beds and fisheries, within the jurisdictional limit, is not a "privi-

lege or immunity" to which the citizens of the United States are entitled in all the States, but a property right, from the enjoyment of which the States may lawfully forbid all others, save their own citizens. Corfield vs. Coryell, 4 Wash. C. C. 380, by Mr. Justice Washington; Bennett vs. Boggs, Bald. C. C. 60; McCready vs, Virginia, 94 U. S., p. 395.

The Hon. Mr. Tucker, of Virginia, in the report of the Committee on Judiciary, in the 49th Congress, 1st session (Report 2385), states that

"The navigable waters within each State belong to it, subject to the paramount right of navigation, for the benefit of its own people, and it has the right to secure the exclusive right of fishing in them to its own citizens, by virtue of their common property in said waters, and that citizens of other States have no constitutional right, nor can Congress confer any, to participate in them."

We have the honor to be,
Very repectfully,
Your obedient servants,
JOHN S. SUDLER,
Commissioner for the Eastern Shore,
RICHARD T. BROWNING,
Commissioner for the Western Shore.

December, 1893.

EELS.

To the Honorable,
the General Assembly of Maryland:

In accordance with the provisions of Chapter 497, of the Act of 1888, we submit herewith a report of our proceedings concerning the destruction of eels, as required by said law, one-fourth of the fund appropriated for the use of the Fish Commission, in the years 1892 and 1893, being set apart for their destruction.

The amount set apart for this purpose in 1892 was		$2,000 00
The amount set apart for this purpose in 1893 was		2,300 00
Received from Granville R. Rider, late Fish Commissioner, balance in his hands		12 92
Received from sales of eels in 1892		30 77
Received from sales of eels in 1893		50 50
Total receipts		$4,394 19
Expenses in catching, destroying and marketing 74,082 eels in 1892	$1,866 41	
Expenses in catching, destroying and marketing 96,604 eels in 1893	2,066 57	
Amount used in hatching and in propagating shad and credited to the fund for that purpose	274 43	
		4,207 41
Balance due eel fund		$186 78
Amount of appropriation for 1892, not drawn out of the Treasury,		$500 00
Amount of appropriation for 1893, not drawn out of the Treasury,		200 00
Total amount remaining to the credit of the fund		$886 78

We think the old-time oak-split eel pot, baited with fresh offal of any kind, the best way to catch eels, and we recommend the continuance of the use of the same.

JOHN S. SUDLER,
RICHARD T. BROWNING,
Commissioners of Fisheries.

December, 1893.

APPENDIX "A."

Showing in Detail the Date of Fish Stripped, Number of Eggs Obtained, Number of Fish Hatched, Where Deposited and Number of Fry Deposited, from the Different Stations in Maryland for 1892 and 1893; with Tables Covering the Fishery Statistics of the State, Prepared by the U. S. Fish Commission.

Distribution of Trout from the Druid Hill Park Station, by R. T. Browning, Fish Commissioner, for 1892.

NAME.	LOCALITY.	NUMBER
James W. Bassett	Freeman, Md	2,000
Capt. E. M. Friend	Bear Creek	11,000
G. C. Keller	Casselman River	5,000
J. Frank Seiss	Cumberland	500
Wm. Fell Johnson	Brookeville	2,000
J. M. Davis	Mountain Lake	5,000
Judge Wilson	Oakland	3,000
T. Egerton Hogg	Port Deposit	500
H. W. Hasson		500
J. W. Williams	Deer Park	300
	Deep Creek	20,000
		49,800

Note.—Commissioner Browning also distributed in the waters of Western Maryland, in 1892, 26,500,000 young shad.

Distribution of Rainbow-Trout from the Druid Hill Park Station, from March 14, 1892, to September 30, 1893, by L. W. Delawder, Superintendent.

NAME.	LOCALITY.	NUMBER
Dr. Gore	Baltimore county	10,000
Dr. J. McH. Howard	Gunpowder River	10,000
John Ridgely, of H	Tributaries of Gunpowder River.	6,000
G. Walters	Baltimore county	6,000
John Ridgely, of John		6,000
		38,000

Distribution of Brook-Trout from the Druid Hill Park Station, from March 14, 1892, to September 30, 1893, by L. W. Delawder, Superintendent.

NAME.	LOCALITY.	NUMBER
R. Miller	Deer Creek, near Rocks, Harford county	6,000
N. P. Naughton		8,000
Garrett Brown	Garrett county	7,000
H. Burton	Baltimore county	7,000
W. Lee	Baltimore county	4,000
R. H. Miller		6,000
H. Wilber	Baltimore county	1,000
Chas. Carter	Cecil county	5,000
Richard F. Kimball, attorney at law	Western branches in Baltimore county	10,000
Thomas Baer, attorney at law	Worthington's Valley, Baltimore county	12,000
J. Jenkins	Western Branches in Baltimore county	10,000
		76,000

Distribution of Trout from the Druid Hill Park Station, by R. T. Browning, Commissioner, for 1893.

NAME.	LOCALITY.	NUMBER
T. P. Naughton	Cumberland	300
J. Frank Seiss	Cumberland	300
	Youghiogeny River	25,000
R. T. Browning	Lake Brown	50,000
		75,600

Distribution of Shad from the Druid Hill Park Station, by Superintendent L. W. Delawder, in 1893.

DATE.	LOCALITY.	NUMBER.
May 20.....	Relay House, Patapsco River.	2,000,000
May 25.....	Linthicum Bridge, Patapsco River.....	2,700,000
May 26.....	Back River.....	2,800,000
June 3.....	Relay House, Patapsco River.....	5,000,000
		12,500,000

Distribution of Carp from the Druid Hill Park Station, by R. T. Browning, Commissioner, for 1892 and 1893.

NAME.	NUMBER
Frank O. Smith.....	50
Edward O Donnell	100
T. J. Browning.....	300
Henry Kidder.....	100
Samuel Willard	500
J. T. Bowers	100
J. W. Daniels	300
E. Harshbarger	300
John Brennaman	300
Jonas Gregory	400
DeW. H. Reynolds.....	200
	2650

Distribution of Carp from the Druid Hill Park Station, from March 14, 1892, to September 30, 1893, by L. W. Delawder, Superintendent.

NAME.	LOCALITY.	NUMBER
J. Davis	Baltimore county	400
Frank O. Smith	Dunkirk	200
Horatio Burton	Baltimore county	100
	Garrett county	250
Fritz Meyers		200
J. Odensoss	Baltimore county	100
George Odensoss	Baltimore county	100
Samuel Williams	Baltimore county	150
B. Sutherland		150
John Bayard		50
C. Jones	Harford county	50
L. Chambers	(Delivered at Camden Station)	200
J. C. Roberts	Harford county	100
St. James Hotel	(Private pond)	100
J. Hurst Burger		100
		2250

Distribution of Carp from the Tuckahoe Station, by Thomas Hughlett, Jr., Superintendent, in 1893.

NAME.	LOCALITY.	NUMBER
	King's creek bridge, Choptank river	1500
	Drawbridge, Chicknamicomico river	1000
	Near Airey's, Transquakin river	250
	Higgins' mill pond, Transquakin river	250
	Maple dam, Little Blackwater river	250
	Beaver dam bridge, Big Blackwater river	250
Capt. Jos. Spedden		100
		3600

DISTRIBUTION OF CARP FROM THE SALISBURY STATION, BY SYLVANUS TRADER, SUPERINTENDENT, IN 1893.

NAME.	LOCALITY.	NUMBER
William S. Parsons	Salisbury	75
T. A. Parsons	Pittsville	30
Dr. J. A. Gillis	Spring Hill	75
John F. Jester	Nanticoke	75
.....	Wicomico River	100
Samuel Sudler	Somerset county	50
Fillmore Bounds	Somerset county	50
		455

RECORD OF SHAD-HATCHING OPERATIONS AT TUCKAHOE STATION, FROM APRIL 4 TO MAY 20, 1892, BY THOMAS HUGHLETT, JR., SUPERINTENDENT.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NUMBER HATCHED.	LOCALITY DISTRIBUTED.	NUMBER FRY DEPOSITED.
April 4	1	25,000	20,000	May 3. Maple Dam Bridge, Little Blackwater River, Dorchester county	500,000
April 5	1	25,000	20,000		
April 6	1	25,000	20,000	May 4. Brick Mill, Choptank River, Caroline county	500,000
April 7	2	50,000	40,000		
April 8	2	50,000	40,000	May 5. Millington, Chester River, Kent county	1,000,000
April 12	2	50,000	40,000		
April 15	4	100,000	80,000	May 6. North East, North East River, Cecil county	500,000
April 16	3	75,000	60,000		
April 18	6	150,000	120,000	May 6. Miles Creek, Elk River, Cecil county.	500,000
April 19	11	275,000	225,000	May 7. Federalsburg, Nanticoke River, Caroline county	500,000
April 20	4	100,000	80,000		
April 21	15	375,000	275,000	May 7. At Hatching Station, Choptank River, Talbot county	500,000
April 22	10	250,000	175,000		
April 23	8	200,000	140,000	May 9. Airey's, Transquakin River, Dorchester county	500,000
April 25	40	1,000,000	650,000		
April 26	35	875,000	575,000	May 9. Drawbridge, Chicknamicomico River, Dorchester county	500,000
April 27	50	1,250,000	770,000		
April 28	35	875,000	575,000	May 11. Murphy's Mill, Bohemia River, Cecil county	500,000
April 29	37	925,000	620,000		
April 30	25	625,000	425,000	May 11. Fox Hole, Sassafras River, Kent county	500,000
May 2	39	975,000	650,000		
May 3	34	850,000	550,000	May 12. Rabbit Hill, Miles River, Talbot county	500,000
May 4	60	1,500,000	900,000		
May 5	40	1,000 000	650,000	May 12. Tan Yard Bridge, Tred Avon River, Talbot county	500,000
May 6	30	750,000	500,000		

May 7	20	500,000	375,000	May 13. Beaver Dam, Big Blackwater River, Dorchester county	500,000
May 9	45	1,125,000	650,000	May 14. At Hatching Station	2,000,000
May 10	37	925,000	575,000	May 16. Wye Mills, Wye River, Talbot county	500,000
May 11	39	975,000	600,000		
May 12	41	1,025,000	625,000		
May 13	33	825,000	500,000	May 20. Greensboro, Choptank River, Caroline county	500,000
May 14	20	500,000	375,000		
May 16	27	675,000	450,000	May 21. At Hatching Station	2,000,000
May 17	36	900,000	575,000	May 24. Centreville, Corsica River, Queen Anne's county	500,000
May 18	25	625,000	425,000		
May 19	23	575,000	350,000	May 25. At Hatching Station	1,000,000
May 20	17	425,000	300,000		
	858	21,450,000	14,000,000		14,000,000

RECORD OF SHAD-HATCHING OPERATIONS AT NANTICOKE STATION, FROM APRIL 8 TO MAY 24, 1892, BY WALTER C. MANN, SUPERINTENDENT.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NO. HATCHED.	LOCALITY DISTRIBUTED.	NO. FRY DEPOSITED.
April 8	5	125,000	100,000	April 16. Nanticoke River	575,000
April 11	7	175,000	150,000	April 16. Plumb Creek	500,000
April 25	10	250,000	250,000		
April 26	14	350,000	350,000		
April 27	11	275,000	275,000		
April 28	5	125,000	100,000		
April 29	8	200,000	200,000		
May 2	24	600,000	500,000		
May 3	15	375,000	350,000	May 4. Seaford, Nanticoke River	500,000
May 4	19	475,000	450,000	May 6. Chicknamicomico River	900,000
May 5	9	225,000	200,000	May 10. Federalsburg, Nanticoke River (N. W. Fork)	475,000
May 9	10	250,000	250,000	May 12. Laurel Creek	375,000
May 10	4	100,000	100,000	May 14. Beaver Creek	500,000
May 11	1	25,000	25,000	May 21. Wright's Wharf, Marsh Hope Creek	800,000
May 16	22	550,000	475,000		
May 17	10	250,000	225,000		
May 18	6	150,000	150,000		
May 19	10	250,000	225,000		
May 20	7	175,000	175,000		
May 21	5	125,000	125,000	May 24. Phillips' Seine Grounds, Nanticoke River	475,000
May 23	11	275,000	275,000		
May 24	6	150,000	150,000		
	219	5,475,000	5,100,000		5,100,000

RECORD OF HERRING-HATCHING OPERATIONS AT NANTICOKE STATION, FROM APRIL 7 TO MAY 14, 1892, BY WALTER C. MANN, SUPERINTENDENT.

DATE.	EGGS OBTAINED.	NO. HATCHED.	LOCALITY DISTRIBUTED.	NO. FRY DEPOSITED.
April 7	400,000		These fish were distributed in Plumb Creek and in Nanticoke River as soon as hatched.	
" 12	925,000			
" 13	350,000			
" 14	625,000			
" 15	300,000			
" 19	500,000			
" 20	725,000			
" 21	250,000			
" 22	300,000			
" 23	875,000			
" 25	950,000			
May 12	950,000			
" 13	350,000			
" 14	800,000			
	8,300,000	7,300,000		7,300,000

NOTE.—April 18, 1892. Deposited also 650,000 young perch in Plumb Creek and in the Nanticoke River. W. C. M.

RECORD OF SHAD-HATCHING OPERATIONS AT SALISBURY STATION, FROM APRIL 6 TO MAY 25, 1892, BY SYLVANUS TRADER, SUPERINTENDENT

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NUMBER HATCHED.	LOCALITY DISTRIBUTED.	NUMBER FRY DEPOSITED.
April 6	2	50,000	50,000		
April 7	4	100,000	90,000		
April 8	3	75,000	75,000		
April 9	6	150,000	115,000		
April 12	7	175,000	135,000		
April 15	5	125,000	100,000		
April 16	6	150,000	110,000		
April 20	2	50,000	50,000		
April 22	2	50,000	50,000		
April 26	11	275,000	225,000	April 19. Princess Anne, Manokin River	150,000
April 27	3	75,000	70,000	April 21. Wicomico River	50,000
April 28	7	175,000	135,000	April 24. Wicomico River	40,000
April 29	3	75,000	75,000	April 25. Wicomico River	125,000
April 30	11	275,000	225,000	April 26 Wicomico River	150,000
May 3	6	150,000	120,000	April 28. Wicomico River	125,000
May 4	13	325,000	245,000	May 3. Wicomico River	200,000
May 5	12	300,000	250,000	May 4. Wicomico River	50,000
May 6	2	50,000	50,000	May 5. Wicomico River	150,000
May 7	4	100,000	75,000	May 6. Pocomoke River	400,000
May 10	6	150,000	120,000	May 7. Wicomico River	25,000
May 11	2	50,000	50,000	May 8. Wicomico River	600,000
May 13	2	50,000	50,000	May 17. Manokin River	300,000
May 18	12	300,000	220,000	May 23. Pocomoke River	300,000
May 19	11	275,000	240,000	May 23. Annamessex River	200,000
May 24	4	100,000	80,000	May 28. Annamessex River	200,000
May 25	8	200,000	160,000	May 29. Wicomico River	100,000
	154	3,850,000	3,165,000		3,165,000

RECORD OF SHAD-HATCHING OPERATIONS AT TUCKAHOE STATION, FROM APRIL 6 TO MAY 20, 1893, BY THOMAS HUGHLETT, JR. SUPERINTENDENT.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NO. HATCHED.	LOCALITY DISTRIBUTED.	NO. FRY DEPOSITED.
April 6	7	175,000	110,000		
" 7	5	125,000	80,000		
" 8	8	200,000	120,000		
" 10	30	750,000	450,000		
" 11	18	450,000	270,000		
" 12	25	625,000	375,000		
" 13	21	525,000	320,000		
" 14	40	1,000,000	600,000		
" 15	27	675,000	410,000		
" 17	40	1,000,000	600,000		
" 18	30	750,000	450,000	April 19. Washed out at station.	4,000,000
" 19	30	750,000	450,000	April 26. Headwaters of Tuckahoe River, in Talbot and Queen Anne's counties	375,000
" 20	50	1,250,000	750,000	April 27. Brick Mills, Choptank River, Caroline co..	750,000
" 21	25	625,000	375,000	April 28. Tanyard Bridge, Tred Avon River, Talbot county	500,000
" 22	20	500,000	300,000	April 29. Elk River, Cecil county	1,000,000
" 24	35	875,000	525,000	May 1. Maple Dam, Little Blackwater River, Dorchester county	500,000
" 25	75	1,875,000	1,125,000	May 2. Big Blackwater River, Dorchester county....	500,000
" 26	30	750,000	450,000	May 4. Millington, Chester River, Kent county.....	1,000,000
" 27	80	2,000,000	1,200,000	May 5. Corsica River, Queen Anne's county	1,000,000
" 28	60	1,500,000	900,000	May 6. N. W. Fork, Nanticoke River, Caroline co...	1,000,000
" 29	75	1,875,000	1,125,000	May 8. Bohemia River, Cecil county	1,000,000
May 1	95	2,375,000	1,425,000	May 8. Sassafras River, Cecil county	1,000,000
" 2	125	3,125,000	1,875,000		
" 3	40	1,000,000	600,000		
" 4	30	750,000	450,000		

RECORD OF SHAD-HATCHING OPERATIONS AT TUCKAHOE STATION—continued.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NO. HATCHED.	LOCALITY DISTRIBUTED.	NO. FRY DEPOSITED.
May 5	25	625,000	375,000	May 9. Carter's Bridge, Choptank River, Caroline	
" 6	20	500,000	300,000	county	500,000
" 8	85	2,125,000	1,275,000	May 10. North East River, Cecil county	1,000,000
" 9	60	1,500,000	900,000	May 11. Chester River, Kent county	1,000,000
" 10	75	1,875,000	1,125,000	May 12. Sapp's Mills, Choptank River, Caroline co.	500,000
" 11	55	1,375,000	825,000	May 12. Greensboro, Choptank River, Caroline co.	1,000,000
" 12	40	1,000,000	600,000	May 12. Little Blackwater River, Dorchester county	500,000
" 13	25	625,000	375,000	May 12. Big Blackwater River, Dorchester county	500,000
" 15	50	1,250,000	750,000	May 15. Chicknamicomico River, Dorchester county.	1,000,000
" 16	45	1,125,000	675,000	May 16. Watt's Creek, Choptank River, Caroline co.	1,000,000
" 17	35	875,000	525,000	May 17. Miles River, Talbot county	1,000,000
" 18	40	1,000,000	600,000	May 18. Transquakin River, Dorchester county	1,000,000
" 19	37	925,000	550,000	May 22. Tuckahoe Station	3,000,000
" 20	27	675,000	415,000		
	1640	41,000,000	24,625,000		24,625,000

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NUMBER HATCHED.	LOCALITY DISTRIBUTED.	NUMBER FRY DEPOSITED.
April 10	6	150,000	135,000		
April 11	9	225,000	210,000		
April 12	7	175,000	160,000		
April 14	6	150,000	135,000		
April 17	14	350,000	315,000		
April 18	8	200,000	180,000		
April 19	12	300,000	270,000		
April 20	3	75,000	70,000		
April 21	9	225,000	210,000		
April 24	27	675,000	620,000		
April 25	9	225,000	210,000		
April 26	6	150,000	135,000		
April 27	8	200,000	180,000	Plumb Creek	150,000
April 28	4	100,000	90,000	Sharptown, Nanticoke River	400,000
May 1	17	425,000	385,000	Sharptown, Nanticoke River	125,000
May 2	7	175,000	160,000	Truitt's Wharf, Nanticoke River	500,000
May 3	13	325,000	300,000	Laurel, Laurel River	500,000
May 5	12	300,000	270,000	Federalsburg, Marsh Hope Creek	800,000
May 8	10	250,000	225,000		
May 10	12	300,000	270,000	Sharptown, Nanticoke River	400,000
May 11	8	200,000	180,000	Brookview, Marsh Hope Creek	500,000
May 12	5	125,000	115,000	Mouth of Plumb Creek	325,000
May 15	5	125,000	115,000	Barren Creek Springs, Barren Creek	500,000
May 16	9	225,000	210,000	Phillips' Seine Landing	300,000
May 18	4	100,000	90,000	Lucas' Island, Nanticoke River	300,000
May 19	7	175,000	160,000	Portsville, Laurel River	300,000
May 22	14	350,000	315,000	Sharptown, Nanticoke River	275,000
May 23	16	400,000	360,000	Riverton, Nanticoke River	700,000
	267	6,675,000	6,075,000		6,075,000

RECORD OF SHAD-HATCHING OPERATIONS AT THE SALISBURY STATION, FOR 1893, BY SYLVANUS TRADER, SUPERINTENDENT.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NUMBER HATCHED.	LOCALITY DISTRIBUTED.	NUMBER FRY DEPOSITED.
April 5	4	100,000	95,000		
April 6	4	100,000	95,000		
April 7	5	125,000	120,000		
April 8	5	125,000	120,000		
April 10	10	250,000	235,000		
April 12	7	175,000	165,000		
April 13	14	350,000	335,000		
April 14	7	175,000	165,000		
April 15	5	125,000	120,000		
April 18	10	250,000	235,000	Salisbury, Wicomico River	75,000
April 19	10	250,000	235,000	Snow Hill, Pocomoke River	400,000
April 20	14	350,000	335,000	Princess Anne, Manokin River	200,000
April 21	15	375,000	365,000	Wicomico River	100,000
April 22	9	225,000	215,000	Wicomico River	250,000
April 25	16	400,000	380,000	Pocomoke City, Pocomoke River	400,000
April 26	11	275,000	260,000	Pocomoke City, Pocomoke River	600,000
April 27	1	25,000	25,000	Wicomico River	250,000
April 28	3	75,000	70,000	Wicomico River	300,000
April 29	2	50,000	45,000	Back Creek	250,000
May 2	6	150,000	140,000	Wicomico River	200,000
May 3	4	100,000	95,000	Tony Tank Creek	200,000
May 4	8	200,000	190,000	Wicomico River	300,000
May 5	8	200,000	190,000	Wicomico River	250,000
May 6	4	100,000	95,000	Wicomico River	150,000
May 9	21	525,000	500,000	Passadyke Creek	300,000
May 10	18	450,000	435,000	Quantico Creek	300,000
May 11	12	300,000	285,000	Virginia Commission	200,000

May 12	11	275,000	260,000	Snow Hill, Pocomoke River	1,000,000
May 13	13	325,000	315,000	Wicomico River	225,000
May 17	11	275,000	260,000	Wicomico River	300,000
May 19	4	100,000	90,000	St. Martin's River	400,000
May 20	6	150,000	140,000	Wicomico River	100,000
May 22	14	350,000	335,000	Wicomico River	200,000
May 23	8	200,000	180,000	Wicomico River	175,000
	300	7,500,000	7,125,000		7,125,000

RECAPITULATION OF SHAD HATCHING OPERATIONS IN THE STATE OF MARYLAND, FROM 1875 TO 1893, INCLUSIVE.

DATE.	SHAD STRIPPED.	EGGS OBTAINED.	NUMBER HATCHED.	LOCALITY DEPOSITED.	NUMBER FRY DEPOSITED.
1875	605	11,690,000	9,315,550	By State in Maryland waters	4,340,000
				By United States Commission in Potomac River	4,975,000
1876	....	9,000,000	4,622,000	In Maryland waters	2,724,500
				In other localities	1,897,500
1877	1,284	10,584,000	8,444,300	By State in Maryland waters	7,319,300
				Turned over to United States Fish Commission	1,125,000
1878	....	12,730,000	8,285,000	In Potomac River	1,175,000
				In Susquehanna River	5,105,000
				In other waters of Maryland	2,005,000
1879	2,067	20,355,000	16,062,000	In Maryland waters	7,757,000
				In Pennsylvania and other waters, by United States Fish Commission	8,305,000
1880	3,756	34,104,000	30,608,000	In Maryland waters	23,498,000
				In other waters	7,110,000
1881	1,071	11,960,000	8,860,000	In Maryland waters	8,363,000
1882	1,279	12,220,000	11,080,000	In Maryland waters	11,080,000
1883	2,584	23,420,000	17,640,000	.....	17,640,000
1884	....	.....	.....	.....	....
1885	1,236	13,105,000	10,791,000	.....	10,791,000
1886	....	.....	.....	.....	.....
1887	606	15,050,000	12,665,000	†In Western Shore waters	8,200,000
				In Eastern Shore waters	12,665,000
*1888	....	.....	.....	.....	.....
1889	1,766	59,975,000	52,735,000	.....	52,735,000
1890	1,157	28,925,000	22,265,000	.....	22,265,000
1891	1,433	35,825,000	26,340,000	In Eastern Shore waters	26,340,000
				†In Western Shore waters	31,730,000
1892	1,231	30,775,000	22,265,000	†In Western Shore waters	26,500,000
				In Eastern Shore waters	22,265,000
1893	2,207	53,175,000	37,825,000	In Eastern Shore waters	37,825,000
				†In Western Shore waters	12,500,000

*Report of 1888 included in that of 1889.

†No report as to number shad stripped, eggs obtained, fry hatched.

RECAPITULATION—FOOD-FISHES DISTRIBUTED IN MARYLAND WATERS BY THE MARYLAND FISH COMMISSIONERS, FROM 1874 TO 1893, INCLUSIVE.

NAME OF FISH.	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884
Carp									8,145		
Herring									365,000		
Perch									8,040,000		
Salmon (California)	144,000	91,500	1,088,304	150,500	710,600	312,236	421,952				
Salmon (Land Locked)			22,600		40,781	26,500	16,900				
Shad		4,340,000	2,724,500	7,319,300	8,285,000	7,757,000	23,498,000	8,363,000	11,080,000	17,640,000	
Smelt			3,475	400,000							
Trout (Brook)				50,480	234,500	47,000	57,180				
Trout (California)						6,135	12,768				
Trout (Rainbow)											

RECAPITULATION—FOOD-FISHES DISTRIBUTED IN MARYLAND WATERS BY THE MARYLAND FISH COMMISSIONERS, FROM 1874 TO 1893, INCLUSIVE.

NAME OF FISH.	1885	1886	1887	1888	1889	1890	1891	1892	1893
Carp			101,580			3,000	3,150	2,650	6,305
Herring			10,450,000					7,300,000	
Perch			2,775,000			2,500,000		650,000	
Salmon (California)									
Salmon (Land Locked)									
Shad	10,791,000		20,865,000	(*)	52,735,000	22,265,000	58,070,000	48,765,000	50,325,000
Smelt									
Trout (Brook)			400,700				117,800	49,800	151,600
Trout (California)									
Trout (Rainbow)							2,000		38,000

* Included in 1889.

1. Table Showing the Number of Persons Employed in the Fisheries of Maryland in 1891.

(Prepared by the United States Fish Commission.)

HOW ENGAGED.	EASTERN SHORE.	WESTERN SHORE.	TOTAL.
In vessel fisheries	4,447	2,445	6,892
On vessels transporting	653	788	1,441
In shore or boat fisheries	11,672	8,015	19,687
On shore, in canneries, etc	3,148	8,587	11,735
Total	19,920	19,835	39,755

2. TABLE SHOWING THE APPARATUS AND CAPITAL EMPLOYED IN THE FISHERIES OF MARYLAND IN 1891.

(Prepared by the United States Fish Commission.)

DESIGNATION.	EASTERN SHORE.		WESTERN SHORE.		TOTAL.	
	NO.	VALUE.	NO.	VALUE.	NO.	VALUE.
Vessels fishing	877	$571,280	348	$305,425	1,225	$876,705
Tonnage	12,163.75	.....	8,868.82	.....	21,032.57	.....
Outfit	.....	232,327	.....	99,382	.....	331,709
Vessels transporting	176	248,700	223	319,550	399	568,250
Tonnage	5,437.58	.....	7,657.81	.....	13,095 39	.....
Outfit	.....	33,851	.....	25,339	.....	59,190
Boats	6,134	401,087	3,615	175,686	9,749	576,773
Apparatus of capture—vessel fisheries:						
Seines	10	6,300	5	2,150	15	8,450
Dredges	1,865	87,084	554	24,290	2,419	111,374
Tongs	291	2,267	203	2,020	494	4,287
Apparatus of capture—shore fisheries:						
Seines	322	28,480	193	38,175	515	66,655
Pound nets	354	26,275	356	39,905	710	66,180
Gill nets	10,613	65,065	1,320	29,849	11,933	94,914
Fyke nets	3,500	21,779	5,866	16,145	9,366	37,924
Trammel nets	.....	.....	23	2,725	23	2,725
Weirs	221	2,758	51	365	272	3,123
Pots	3,501	2,975	1,135	1,038	4,636	4,013
Lines	.....	1,518	.....	754	.....	2,272
Dredges and scrapes	1,898	8,644	170	1,865	2,068	10,509
Tongs	8,434	40,128	4,487	32,622	12,921	72,750
Minor apparatus	.....	1,986	.....	512	.....	2,498
Shore property	.....	321,021	.....	2,124,671	.....	2,445,692
Cash capital	.....	347,955	.....	1,759,500	.....	2,107,455
Total	.....	$2,451,480	.....	$5,001,968	.....	$7,453,448

3. Table Showing the Products of the Fisheries of Maryland in 1891.

(Prepared by the United States Fish Commission.)

Species.	Eastern Shore.		Western Shore.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives (or herrings)	5,065,365	$ 31,530	11,887,996	$ 95,280	16,953,361	$ 126,810
Bluefish	231,742	9,878	284,622	12,883	516,364	22,761
Catfish	717,485	24,111	574,417	21,205	1,291,902	45,316
Eels	455,068	18,613	336,976	14,306	792,044	32,919
Menhaden (or alewife)	21,875,520	44,202	9,076,600	21,105	30,952,120	65,307
Mullet	101,540	2,974	.....	.....	101,540	2,974
Perch, white	617,890	30,922	487,133	25,870	1,105,023	56,792
Perch, yellow	641,557	24,287	740,675	23,567	1,382,232	47,854
Pike	226,356	13,483	336,908	21,778	563,264	35,261
Sea bass	113,370	4,544	.....	.....	113,370	4,544
Shad	2,844,458	99,551	3,168,798	106,714	6,013,256	206,265
Sheepshead	1,020	115	2,165	281	3,185	396
Spanish mackerel	8,387	1,120	36,450	4,249	44,837	5,369
Spots and croakers	174,748	7,690	97,995	4,422	272,743	12,112
Squeteague (or salt water trout)	489,745	17,242	260,720	8,660	750,465	25,902
Striped bass (or rockfish)	632,964	48,084	628,879	49,353	1,261,843	97,437
Sturgeon	26,845	1,203	45,600	1,140	72,445	2,343
Suckers	181,043	4,800	102,515	2,689	283,558	7,489
Other fish	269,419	8,632	254,220	7,693	523,639	16,325
Clams (meats)	147,760	8,226	.....	.....	*147,760	8,226
Oysters (meats)	53,618,152	3,891,514	15,997,254	1,404,352	†69,615,406	5,295,866
Crabs, hard	1,673,500	24,673	1,103,398	12,787	2,776,898	37,460
Crabs, soft	4,450,552	228,247	378,320	38,009	4,828,872	266,256
Crayfish	.....	.....	7,350	695	7,350	695
Shrimp	.....	.....	8,044	3,960	8,044	3,960
Frogs	4,600	690	.....	.....	4,600	690
Terrapins	89,150	21,976	630	357	89,780	22,333
Turtles	4,060	231	.....	.....	4,060	231
Total	94,662,296	$4,568,538	45,817,665	$1,881,355	140,479,961	$6,449,893

*Represents 18,740 bushels. †Represents 9,945,058 bushels.

4. Table Showing the Yield of the Vessel-Fisheries of Maryland in 1891.

(Prepared by the United States Fish Commission.)

SPECIES.	EASTERN SHORE.		WESTERN SHORE.		TOTAL.	
	POUNDS.	VALUE	POUNDS.	VALUE.	POUNDS.	VALUE.
Menhaden (or alewife)	21,240,000	$ 42,750	7,576,000	$ 17,783	28,816,000	$ 60,533
Oysters (meats)	*26,812,961	1,933,744	†6,885,837	682,096	‡33,698,798	2,615,840
Total	48,052,961	$1,976,494	14,461,837	$699,879	62,514,798	$2,676,373

* 3,830,423 bushels. † 983,691 bushels. ‡ 4,814,114 bushels.

5. TABLE SHOWING BY APPARATUS THE YIELD OF THE

(Prepared by the United

Species.	Seines.		Pound Nets.		Gill Nets.		Fyke Nets.	
	Pounds.	Valne.	Pounds.	Value,	Pounds.	Value.	Pounds.	Value.
Alewives (or herrings)	1,828,000	$ 11,496	1,283,440	$ 8,953	1,644,400	$ 8.697	181,900	$ 1,337
Bluefish	76,477	3,346	54,635	2,580	52,020	2,482	.....	.....
Catfish	216,187	6,984	142,157	4,612	5,830	169	164,370	5,725
Eels	16,610	692	47,850	1,772	.....	.....	115,025	4,592
Menhaden (or alewife)	112,400	278	189,620	325	333,500	849	.....	.....
Mullet	44,300	1,586	5,800	116	50.640	1,250	800	22
Perch, white	190,611	9,285	121,800	6,004	184,424	9,503	69,780	3,703
Perch, yellow	212,458	8,345	135,815	4,587	90,967	3.622	126,822	5,640
Pike	78,157	4.239	32,530	1,952	64,590	3.688	45,569	3,265
Sea bass	110,000	4,400	.....	.....	.....	.....	.....	.....
Shad	455,886	16,098	325,733	11,069	2,008,385	70,195	24,126	874
Sheepshead	.....	.....	.....	.....	.....	.....	.....	.....
Spanish mackerel	4,267	640	.....	.....	4,120	480	.....	.....
Spots and croakers	36,590	1,549	52,460	2,477	8.600	367	3,110	147
Squeteague (or trout)	173,870	7,074	33.385	1,558	79,480	2,576	2,450	98
Striped bass (or rockfish)	224,346	19,887	59,340	4,315	212,740	14,206	89,228	6,310
Sturgeon	6,940	317	15,205	636	4,700	250	.....	.....
Suckers	64,220	1,674	73,800	1,953	.....	.....	35,233	993
Other fish	80,959	2,434	53,296	1,744	66,200	2,136	32,429	1,169
Clams (meats)	.....	.....	.....	.....	.....	.....	.....	.....
Oysters (meats)	.....	.....	.....	.....	.....	.....	.....	.....
Crabs, hard	.....	.....	.....	.....	.....	.....	.....	.....
Crabs, soft	.....	.....	.....	.....	.....	.....	.....	.....
Frogs	.....	.....	.....	.....	.....	.....	.....	.....
Terrapins	.....	.....	.....	.....	.....	.....	.....	.....
Turtles	.....	.....	.....	.....	.....	.....	.....	.....
Total	3,932,278	$100,224	2,626,866	$54.653	4,810,596	$120,470	890,842	$33,875

BOAT-FISHERIES OF THE EASTERN SHORE OF MARYLAND IN 1891.

States Fish Commission.)

Weirs.		Lines.		Bow Nets, Pots, Spears, Etc.		Other Apparatus.		Total.	
Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
104,405	$ 890	.....	.....	23,220	$ 157	.....	.....	5,065,365	$ 31,530
.....	.....	48,610	$ 1,470	.....	.....	.....	.....	231,742	9,878
51,241	1,596	129,920	4,832	7,780	193	.....	.....	717,485	24,111
5,440	218	1,468	51	268,675	11,288	.....	.....	455,068	18,613
.....	.....	.....	.....	.....	.....	.....	.....	635,520	1,452
.....	.....	.....	.....	.....	.....	.....	.....	101,540	2,974
23,965	1,189	26,510	1,208	800	30	.....	.....	617,890	30,922
43,365	1,198	10,230	325	21,900	670	.....	.....	641,557	24,287
4,170	258	1,340	81	.....	.....	.....	.....	226,356	13,483
.....	.....	3,370	144	.....	.....	.....	.....	113,370	4,544
14,455	498	.....	.....	15,873	817	.....	.....	2,844,458	99,551
.....	.....	1,020	115	.....	.....	.....	.....	1,020	115
.....	.....	.....	.....	.....	.....	.....	.....	8,387	1,120
3,500	170	70,488	2,980	.....	.....	.....	.....	174,748	7,690
1,000	40	199,560	5,896	.....	.....	.....	.....	489,745	17,242
24,995	1,660	18,875	1,474	3,440	232	.....	.....	632,964	48,084
.....	.....	.....	.....	.....	.....	.....	.....	26,845	1,203
7,790	180	.....	.....	.....	.....	.....	.....	181,043	4,800
12,200	321	23,685	808	650	20	.....	.....	269,419	8,632
.....	.....	.....	.....	.....	.....	147,760	$ 8,226	*147,760	8,226
.....	.....	.....	.....	.....	.....	26,805,191	1,957,770	†26,805,191	1,957,770
.....	.....	.....	.....	.....	.....	1,673,500	24,673	1,673,500	24,673
.....	.....	.....	.....	.....	.....	4,450,552	228,247	4,450,552	228,247
.....	.....	.....	.....	.....	.....	4,600	690	4,600	690
.....	.....	.....	.....	.....	.....	89,150	21,976	89,150	21,976
.....	.....	.....	.....	.....	.....	4,060	231	4,060	231
296,526	$8,218	535,076	$19,384	342,338	$13,407	33,174,813	$2,241,813	46,609,335	$2,592,044

* Represents 18,470 bushels.

† Represents 3,829,313 bushels.

6. TABLE SHOWING BY APPARATUS THE YIELD OF THE

(Prepared by the United

SPECIES.	SEINES.		POUND NETS.		GILL NETS.		FYKE NETS.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives (or herrings)	7,351,031	$62.501	3,204,095	$24,584	1,162,500	$ 7,026	58,300	$ 379
Bluefish	34,042	1,680	54,580	2,453	167.000	7,300	.....	.....
Catfish	152,070	6,060	94,048	2,876	9,285	340	148.855	6,030
Eels	23,566	993	44,140	1,742	.....	.....	111.375	5,162
Menhaden (or alewife)	640.000	1,700	743.100	1,387	117,500	235	.....	.....
Perch, white	202,990	10,904	97,423	5,062	65,803	3,318	87,252	4.784
Perch, yellow	307,608	10,320	181,460	5,721	47,004	1,600	127,724	3,792
Pike	111,520	7,393	68,440	4,109	60,435	4,085	60,675	3,953
Shad	933,358	34,715	601,802	21,940	1,621,402	49,640	4,361	149
Sheepshead	.....	.....	.....	.....	.....	.....	.....	.....
Spanish mackerel	.....	.....	30,200	3,624	6,250	625	.....	.....
Spots and croakers	30,945	1,421	35,910	1.977	2,640	132	.....	.....
Squeteague (or salt water trout)	23,690	1,119	47,950	2,236	6.030	295	.....	.....
Striped bass (or rockfish)	258,375	20,845	181,618	13.274	114,495	9,635	12,405	1,110
Sturgeon	.....	.....	.....	.....	45,600	1,140	.....	.....
Suckers	16,800	422	39,560	1,020	12,200	305	14,190	392
Other fish	77,215	2,133	73,818	2,498	40,551	1,195	30,885	933
Oysters (meats)	.....	.....	.....	.....	.....	.....	.....	.....
Crabs, hard	.....	.....	.....	.....	.....	.....	.....	.....
Crabs, soft	.....	.....	.....	.....	.....	.....	.....	.....
Crayfish	.....	.....	.....	.....	.....	.....	.....	.....
Shrimp	.....	.....	.....	.....	.....	.....	.....	.....
Terrapins	.....	.....	.....	.....	.....	.....	.....	.....
Total	10,163,210	$162,206	5,498,144	$94,503	3,478,695	$86,871	656,022	$26,684

BOAT-FISHERIES OF THE WESTERN SHORE OF MARYLAND IN 1891.

States Fish Commission.)

Trammel Nets.		Weirs.		Lines.		Bow Nets, Pots, Spears, Etc.		Other Apparatus.		Total.	
Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
.....	.....	15,000	$ 62	.....	.....	97,070	$ 728	.....	.....	11,887,996	$ 95,280
.....	.....	.....	.....	29,000	$1,450	.....	.....	.....	.....	284,622	12,883
26,315	$ 955	13,050	437	130,794	4,507	.....	.....	.....	.....	574,417	21,205
.....	.....	.....	.....	680	34	157,215	6,375	.....	.....	336,976	14,306
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,500,600	3,322
17,510	925	10,600	530	3,985	222	1,570	125	.....	.....	487,133	25,870
19,096	600	56,100	1,468	360	14	1,323	52	.....	.....	740,675	23,567
25,868	1,625	9,970	613	.....	.....	.....	.....	.....	.....	336,908	21,778
.....	.....	7,875	270	.....	.....	.....	.....	.....	.....	3,168,798	106,714
.....	.....	.....	.....	2,165	281	.....	.....	.....	.....	2,165	281
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36,450	4,249
.....	.....	.....	.....	28,500	892	.....	.....	.....	.....	97,995	4,422
.....	.....	.....	.....	183,050	5,010	.....	.....	.....	.....	260,720	8,660
12,041	1,040	2,820	212	47,125	3,237	.....	.....	.....	.....	628,879	49,353
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45,600	1,140
8,600	215	.....	.....	.....	.....	11,165	335	.....	.....	102,515	2,689
14,566	437	4,950	142	9,400	280	2,835	75	.....	.....	254,220	7,693
.....	.....	.....	.....	.....	.....	.....	.....	9,111,417	$722,256	*9,111,417	722,256
.....	.....	.....	.....	.....	.....	.....	.....	1,103,398	12,787	1,103,398	12,787
.....	.....	.....	.....	.....	.....	.....	.....	378,320	38,009	378,320	38,009
.....	.....	.....	.....	.....	.....	.....	.....	7,350	695	7,350	695
.....	.....	.....	.....	.....	.....	.....	.....	8,044	3,960	8,044	3,960
.....	.....	.....	.....	.....	.....	.....	.....	630	357	630	357
123,996	$5,797	120,365	$3,734	435,059	$15,927	271,178	$7,690	10,609,159	$778,064	31,355,828	$1,181,476

* Represents 1,301,631 bushels.

Appendix "B."

Giving the Correspondence from Fishermen and Others Interested in the Propagation of Food-Fishes, and Clippings from the Papers of Maryland on Fish-Culture.

CORRESPONDENCE.

MR. SUDLER.

Dear Sir: I have been fishing on the Wicomico river a good many years, but the shad this Spring have been the finest ever known here. I attribute it to the fish-hatching industry, and I believe it a profitable investment for the State. Yours,

J. K. L. MALONE.

SALISBURY, May, 1893.

HON. JOHN S. SUDLER.

Dear Sir: I have been engaged in fishing on the Wicomico river for many years. I have watched the increase of shad from year to year with a great deal of interest, and I am confident the increase of fish is largely due to the operations of the Fish-Hatcheries. Call on any fisherman on the river who has given the matter any thought, and he will tell you what a blessing your work has done.

Very respectfully,

ELIJAH TOWNSEND.

MAY 15, 1893.

MR. SUDLER.

Dear Sir: I have been fishing on the Wicomico river for several years. I have caught a finer lot of shad this Spring than ever before. I attribute it to the catching and destruction of eels, and to the Fish-Hatcheries. Fish-culture is of great benefit to us, and the men employed under your superintendence have done their duty, and it is to be hoped that the work may continue. Yours respectfully,

L. F. MESSICK.

COLLINS' WHARF, May 17, 1893.

MR. SYLVANUS TRADER.

Dear Sir: I thought I would drop you a few lines with regard to fish-hatching and its usefulness. In view of the fact that the eggs used by you are from fish caught for market, there are no more shad taken than would be, if there was no fish-hatching. If only one hundred shad are hatched by you, that is so much added to the stock; but you hatch by the thousand—even million—enough to supply any ordinary river. Let us have the fish-hatching business go on, for there is no harm done by it.

While Nature is trying to hatch a few shad and herring, the eel comes along and destroys the fry. But for the destruction of eels there would be but few shad in this river. Shad, this Spring, are scarce, on account of the weather, but herring are more plentiful than for many years past, therefore, I say, keep up your destruction of the eel, the young shad's worst enemy, and we will always have fish to eat.

Respectfully yours,

C. B. SMITH,
Of White Haven.

SALISBURY, June 1, 1893.

MR. JOHN S. SUDLER, *Fish Commissioner.*

Dear Sir: When we first engaged in fishing on the Wicomico river, shad were very scarce, and continued so until this artificial fish-hatching was instituted. We have seen the increase from year to year so plainly that we are convinced it is largely due to the industry of the Fish Commission. Very respectfully,

H. D. TAYLOR,
A. T. TAYLOR,
LOUIS TAYLOR.

SALISBURY, June 13, 1893.

MR. J. S. SUDLER, *Fish Commissioner.*

Dear Sir: We have been fishing for twenty years, and the catch has decidedly increased for the last ten years. In our judgment it is attributable to the hatching-process alone. We are greatly in favor of the State propagation.

WILLIAM WHAYLAND,
WILLIAM TURNER.

Collins' Wharf, June 20, 1893.

Mr. J. S. Sudler, *Fish Commissioner.*

Dear Sir: We have been living on the Wicomico river for fifteen or twenty years, and have been engaged in fishing during that time. We have noticed an increase of fish each year. We attribute the increase, in a great measure, to artificial propagation, it being of great benefit to our food-fish industry, and we think the appropriation ought to be doubled.

Yours respectfully,

John W. Taylor,
Lemuel P. Taylor.

Salisbury, June 20, 1893.

Mr. J. S. Sudler, *Fish Commissioner.*

Dear Sir: I attribute the increase of our fish-food supply to the millions of young fish placed in our river by the Maryland Fish Commission.

Yours truly,

Alexander King.

Salisbury, June 26, 1893.

John S. Sudler, *Fish Commissioner.*

Dear Sir: We thought we would drop you a few lines about your hatching of fish. If you had more money from the State to employ more force and to devote more time to the hatching of perch and rock, we think it would be of great value to the people on the river. It has made a big difference in shad, and, no doubt, it would increase the supply of perch and rock as well.

Yours truly,

James E. Bounds,
George Whayland.

Sharptown, May 2, 1893.

John S. Sudler, *Fish Commissioner.*

Sir: It affords me pleasure to volunteer my testimony in favor of the work of the Fish Commission, which you are so efficiently conducting. I have been engaged in buying shad on the Nanticoke river, from Vienna, Maryland, to Seaford, Delaware, a distance of twenty miles, for thirty-five years, and the increase of

devices for catching fish and the increased number of persons engaged in the business are wonderful. Shad, however, increase year by year, and what can I attribute the increase to but the work of the Fish Commission. Let the good work go on.

Yours very truly,

WILLIAM M. OUTTEN.

CAMBRIDGE, MD., May, 1893.

Dear Sir: I have been fishing twenty years, and the fishing for the season of 1893, up streams, has been the best for four years. The hatching of fish is a good thing when conducted with success. The fishing has been, every season, better since fish culture began, though some seasons are better than others.

T. B. SPARKLIN.

FOWLING CREEK, May 12, 1893.

Gentlemen: Your circular letter concerning the fish industry has been received. I have been in the business fifteen years. This Spring has been the best season for shad and herring since I have been in the business, but I don't know the cause of it.

Respectfully,

W. TOWERS.

LUCAS' ISLAND, May 16, 1893.

JOHN S. SUDLER, *Fish Commissioner.*

My Dear Sir: In reply to your inquiry as to my opinion of the artificial propagation of food-fishes, I will say that I am one of the oldest fishermen on the Nanticoke river. I have been in the haul-seine business for a long time, and I think I am safe in saying that this has been the best season we have had for a long time. I surely attribute this increase to the work of the Fish Commission. Yours truly,

SHEPPERD MASSEY.

BETHEL, May 17, 1893.

JOHN S. SUDLER, *Fish Commissioner.*

My Dear Sir: I fully appreciate your well-conducted efforts, in connection with the force engaged on the Nanticoke river, in the artificial propagation of food-fishes. I have, for a long time, been engaged in the haul-seine business, and have watched the steady increase of fish closely, and cheerfully give the credit, therefor, to your efforts. The season, now about closed, has been a good one.

Yours very truly,
WM. K. PHILLIPS.

DOVER BRIDGE, May 22, 1893.

Dear Sir: I have been engaged in the fishing business for three years. This is the best season I have had. The hatching and distributing of so many young shad from the fishery-station has, no doubt, been the cause of it.

NOBLE L. ROBINSON.

MAY 24, 1893.

JOHN S. SUDLER, *Fish Commissioner.*

Dear Sir: We have been engaged in fishing on the Nanticoke river nearly all our lives, and have been close observers in that business. The gradual increase in the quantity and quality of the fish caught thoroughly convince us that the Fish Commission is indispensable.

Yours truly,
ELMER SULLIVAN,
HARVEY KNOWLES.
PETER MASSIE.

LUCAS' ISLAND, May 24, 1893.

JOHN S. SUDLER, *Fish Commissioner.*

Sir: I, like some others, was once somewhat prejudiced against the Fish Commission. But, since I have seen your men turn out so many young fish from the hatching-station, and have seen, from year to year, a steady increase in the supply, notwithstanding the increase in devices to catch and trap them, that I have

now changed my opinion, and now fully co-operate in and endorse the very efficient work of fish-propagation.

Yours very truly,
EDWIN T. MASSEY.

ELLIS SEINE LANDING, May 24, 1893.
JOHN S. SUDLER, *Fish Commissioner.*

Dear Sir: Having been engaged in fishing on the Nanticoke for a long time, and having watched closely the fishing interest, I think I can safely say that there have been more shad caught in the river this season than for many years, and I credit the Fish Commission, in a large measure, for this noticeable increase, and I take great pleasure in endorsing the work and operations of the Fish Commission.

Yours truly,
JOHN W. KNOWLES.

DISTRIBUTING SHAD FRY.

Col. John S. Sudler, fish commissioner, and deputy commissioner Thomas Hughlett, Jr,, turned loose yesterday morning in the head waters of Corsica river one million of young shad fry. Deputy Commissioner Hughlett has been distributing this season, up to this time, a very large amount of young fish, larger than ever before in Eastern Shore waters. April 26th, 375,000 young shad were distributed in Lloyd's Branch, the head waters of Tuckahoe run; April 27, Choptank river, at Brick Mills, Caroline county, 750,000; April 28th, at Tanyard Bridge, Talbot county, head waters of Tred Avon river, 500,000; April 26th, Elk river, near Elkton, Cecil county, 1,000,000; May 1st, at Maple Dam, Dorchester county, Little Black Water river, 500,000; May 2d, at Beaver Dam Bridge, Dorchester county, Black Water river, 500,000; May 4th, at Millington, in Chester river, 1,000,000; making a total of 5,625,000 young shad fry this season. That the artificial propagation of shad is doing great good there can be no doubt. The report from the shad fisheries all along the Chesapeake for several seasons past shows a gradual and steady increase in the catch. This season the increase exceeds that of any other.—[The Centreville, Md., Record, of Saturday, the 6th of May.]

PRODUCTIVE OF GOOD.

Thomas Hughlett, Jr., Assistant Fish Commissioner, last week deposited 1,000,000 young shad in Chester river at Middletown; 1,000,000 in Corsica river at Centreville, and 1,000,000 in Nanticoke river at Federalsburg. Experienced fishermen express the opinion that the operations of the Fish Commission are productive of much good. The increased catch of fish in Maryland waters is undoubtedly attributable to the work of the hatching-stations.—[The Dorchester Era, Cambridge, Md., of Saturday, the 13th of May.]

SOMERSET COUNTY.

DISTRIBUTION OF THIRTY-SEVEN MILLION YOUNG SHAD.

Special Dispatch to the Baltimore Sun.

PRINCESS ANNE, June 28.—Fish Commissioner John S. Sudler is getting up statistics for his annual report to the Governor. Commissioner Sudler reports the total distribution of shad during the months of April and May to have been thirty-seven millions, and they were distributed from the following stations: Salisbury Station, seven millions; Sharptown Station, on the Nanticoke river, six millions; Tuckahoe Station, twenty-four millions. Mr. Sudler will make his annual report to the Governor during the month of September.

FISH-HATCHING AT SHARPTOWN.

A FULL DESCRIPTION OF THE FISH-HATCHING INDUSTRY ON THE NANTICOKE.

SHARPTOWN, MD., April 12.—The fish-hatching force, W. C. Mann, Jos. M. Smith and S. P. Twiford, of this town, and James Adams, of Vienna, are now at work gathering spawns and placing them in the hatchery. Miss Mary Twiford superintends the hatchery, which is located at Twiford's mill, about one mile from town. The spawns are taken from shad and herring and a few perch. Small boats are used for collecting the spawns, most of which are obtained from fish caught in haul seines, above this point on the river. The selection of the ripe fish can be made much better

from the haul seines than from the float seines, and the fish are usually in a much better condition. The number of spawns taken daily varies considerable, being affected by various circumstances. The work of selecting the spawns and uniting them and placing them in the hatching jars or vessels requires the utmost precision, as upon this depends very materially the success of the process of generation and propagation.

The fish culture here has now become quite well established among fishermen on the Nanticoke, and never has the force entered upon the work with a more friendly recognition by those who are directly interested in the fishing industry than they have done this Spring. In its experimental stage the artificial hatching was slowly accepted here, and perhaps justly so, because the fulness of the work could not be realized until the operators obtained a complete and thorough knowledge of the work, and a large portion of this knowledge must be obtained from actual experience and observation, however much may have been learned of the theory.

W. C. Mann, who has charge of the work here, has been engaged in it for seven years, and gives his time and attention to every detail of work, giving it his personal supervision.

Thus the multiplied experiences, and thorough attention added to an increase in the practical results, have greatly strengthened the efforts, and now the success is quite generally conceded by fishermen in this and other places on the river.

The almost annual increase of the quantity of the fish since the artificial propagation began, and the decrease or normal condition of the fish not thus cultured, proves its practicability a sure thing.

Again it affords employment to many, and market for fish to others, and an increased value of an important industry to many more, thus establishing the industrial advantages of the work.

There are more fish, herring and shad, being caught in the Nanticoke this season than ever before in the recollection and experience of the oldest fishermen. And perhaps there never was as extensive fishing with all the modern appliances.

The fish are numerous, not in one or two places, or in schools, but at all places they seem to be thick, and

the fishermen at all points are alike reaping the abundance of the harvest.

The prices here so far have been low, but the work is remunerative nevertheless, the quantity making up the deficiency between the present and former prices, besides affording an abundance for home consumption.

The eels are said to be very destructive to the fish, especially consuming many from the seines stationed in shallow water. Their destruction is hoped for by many in the near future.—[From Wicomico Co. paper.]

THE GOVERNOR OF PA. ON FISH CULTURE.

It is satisfactory to note the emphasis with which Governor Pattison, in his annual message, commends the work of the Pennsylvania Fish Commissioners. "They have," he says, "by their efficient management greatly contributed toward the restoration of the inland fisheries of the rivers and waters of the Commonwealth." He cites as an instance of their good work the enormous increase in the value of the shad product in the Delaware river in the last two years. This is deserved praise, for perhaps no other body, acting under State authority, has worked harder for the people's interest than the State Fish Commission.

The splendid results achieved the Governor rightly attributes to the enforcement by the Commissioners of the laws against fish weirs and fish baskets. These deadly contrivances are, without doubt, the principal obstruction to fish culture. Before their removal from the waters of this State was ordered, millions of young fish, valuable as adults for food purposes, were annually destroyed through their use, and for this reason one of the chief acts of the Commission was to wage a relentless war against their continuance. Naturally those whose selfishness led them to use these weirs and baskets, regardless of the destruction they caused, fought and still fight the reform bitterly, and at nearly every session of the Legislature there have been bills introduced for their restoration, and members have been found willing to support them. Fortunately these iniquitous measures have as regularly failed of passage.

Efficient as have been the efforts of the Fish Com-

missioners in their work of removing these destructive obstructions in the rivers and streams, they have not been able to accomplish their ends. This is through no lack of attention to their work, but on account of the insufficiency of the penalties against the maintenance of the evil. This Governor Pattison recognizes, and in his message he strongly recommends an increase of the penalties.

The present Legislature ought not to hesitate a moment in carrying out his suggestion. Such action would meet with the hearty approval of all good citizens. The wanton destruction of food-fishes by the means mentioned, or by any other methods, deserves much severer punishment than is now meted out. The present penalties are ridiculously small when compared with the grade of the misdemeanor.

The Governor, while on the subject of fish culture, also called the attention of the Legislature to another evil, which, in the sections in which it exists, is working incalculable injury to the successful propagation and cultivation of food-fishes. This is the pollution of the streams by saw dust, acid, tannery refuse and washings from culm and coal dirt. Entire streams once teeming with fish are now wholly uninhabited through these causes. The Fish Commissioners have done what they could to abate this nuisance, but they have been greatly hampered by inadequate laws to even a greater extent than in their efforts to remove the fish weirs and baskets. Until severe penalties are imposed on people for permitting deleterious matter to flow or be dumped into streams otherwise habitable by food-fishes, complete success in putting a stop to such practices will be impossible.

If the Legislature will heed the recommendations of Govenor Pattison in these particulars, the Fish Commission may be relied upon to see to the enforcement of the law passed.

APPENDIX "G."

CONTAINING A LIST OF THE FISH COMMISSIONERS OF THE SEVERAL STATES AND TERRITORIES OF THE UNITED STATES, AND A LIST OF THE PRINCIPAL OFFICERS AND SUPERINTENDENTS OF STATIONS OF THE UNITED STATES FISH COMMISSION, UP TO SEPTEMBER 30, 1893.

List of the Names and Addresses of the Fish Commissioners of the Several States and Territories of the United States.

(Prepared by the United States Fish Commission.)

ALABAMA.

First Commissioners appointed in 1871. Has no Commissioners now.

ARIZONA.

First Commissioners appointed in April, 1881.

Name.	Residence.
*W. J. Hill	Pelmont.
*Edward Schwartz	Phœnix.
*T. W. Otis	Prescott.

ARKANSAS.

First Commissioners appointed January 25, 1876. Has no Commissioners now.

CALIFORNIA.

First Commissioners appointed April 25, 1870.

Name.	Residence.
*Joseph D. Redding, President	37 Chronicle Bldg., San Francisco.
*H L. McNeil	Los Angeles.
*William C. Murdoch, Secretary	San Francisco.

COLORADO.

First Commissioner appointed February 9, 1877.

Name.	Residence.
Gordon Land	Denver.

*Holds office at pleasure of Governor.

CONNECTICUT.

Fish Commissioners.

First Commissioners appointed September 11, 1866.

Term expires.	Name.	Residence.
March 1, 1896	Samuel M. Bronson	Hartford.
August 26, 1896	James A. Bill, President	Lyme.
March 1, 1896	Richard E. Follett	Lime Rock.

Commissioners of Shell Fisheries.

Commission authorized April 14th, 1881.

Term expires.	Name.	Residence.
June 30, 1895	George C. Waldo	Bridgeport.
June 30, 1895	Charles W. Beardsley	Milford.
June 30, 1897	Christian Schwarz	South Norwalk.

DELAWARE.

First Commissioner appointed April 23, 1881.

Term expires.	Name.	Residence.
August 13, 1896	James Milligan	Delaware City.

FLORIDA.

First Commissioners appointed ———

Term expires.	Name.	Residence.
April 1, 1893	J. H. Smith	Titusville.
April 1, 1893	L. H. Sellers	Pensacola.
July 15, 1895	M. Moseley	Titusville.

GEORGIA.

Commissioner of Agriculture made *ex-officio* Fish Commissioner 1876.

Term expires.	Name.	Residence.
1894	Dr. H. H. Cary	La Grange.
1894	Hon. R. T. Nesbitt	Atlanta.

IDAHO.

Has no Commissioners.

ILLINOIS.

First Commissioners appointed May 20, 1875.

Name.	Residence.
Richard Roe, President	East St. Louis.
O. B. Sickles	Geneva.
George W. Langford	Havana.

INDIANA.

First Commissioner appointed September, 1881.

Term expires.	Name.	Residence.
Jan. 28, 1895	P. H. Kirsch	Columbia City.

IOWA

First Commissioner appointed March 30, 1874.

Term expires.	Name.	Residence.
April 1, 1894	T. J. Griggs	Spirit Lake.

KANSAS.

First Commissioner appointed March 10, 1877.

Term expires.	Name.	Residence.
April 1, 1895	J. W. Wampler	Brazilton.

KENTUCKY.

First Commissioners appointed March 22,1876. Has no Commissioners now

LOUISIANA.

No return.

MAINE.

Commissioners of Fisheries and Game.

First Commissioners appointed January 1, 1867.

Term expires.	Name.	Residence.
Dec. 31, 1894	Thomas H. Wentworth	Bangor.
Dec. 31, 1895	Henry O. Stanley	Dixfield.

Commissioner of Sea and Shore Fisheries.

April 14, 1894	E. W. Gould.	Thomaston.

MARYLAND.

First Commissioners appointed April, 1874.

Term expires.	Name.	Residence.
March 2, 1894	John S Sudler	Manokin.
March 2, 1894	Richard T. Browning	Oakland.

MASSACHUSETTS.

Commissioners of Inland Fisheries and Game.

First Commissioners appointed May 3, 1865.

Term expires.	Name.	Residence.
June 30, 1894	Edward H. Lathrop	Springfield.
Oct. 9, 1894	Edward A. Brackett	Winchester.
Oct. 23, 1894	Isaiah C. Young.	Wellfleet.

MICHIGAN.

First Commissioners appointed April 25, 1873.

Term expires.	Name.	Residence.
Jan. 1, 1893	Joel C. Parker	Grand Rapids.
Jan. 1, 1895	Hoyt Post	Detroit.
Jan. 1, 1897	Hershel Whitaker	Detroit.

MINNESOTA.

First Commissioners appointed in May, 1874.

Term expires.	Name.	Residence.
Jan. 1, 1897	W. S. Timberlake, President	St. Paul.
Jan. 1, 1895	William Bird, Vice President	Fairmont.
Jan. 1, 1897	A. F. Ferris, Secretary	Brainerd.
Jan. 1, 1895	W. P. Andrus, Treasurer	Minneapoils.
Jan. 1, 1899	Fred. von Baumbach	Alexandria.

MISSISSIPPI.

No return.

MISSOURI.

First Commissioners appointed August 2, 1877.

Name.	Residence.
J. T. Crisp, Chairman, President	Independence.
Joseph Griswold	St. Louis.
H. M. Garlichs	St. Joseph.

MONTANA.

Has no Commission.

NEBRASKA.

First Commission appointed June 2, 1879.

Term expires.	Name.	Residence.
June 2, 1893	S. C. Burlingim, President	Seward.
June 2, 1894	B. E. Kennedy	Omaha.
June 2, 1895	W. L. May	Omaha.

NEVADA.

First Commissioners appointed in 1877.

Term expires,	Name.	Residence.
Feb. 21, 1897	George T. Mills	Carson City.

NEW HAMPSHIRE.

First Commissioners appointed August 30, 1866.

Term expires.	Name.	Residence.
	William H. Shurtleff, President	
June 23, 1896	Willard H. Griffin, Secretary	Manchester.
Dec. 2, 1897	Nathaniel Wentworth, Treasurer	Hudson Center.

NEW JERSEY.

First Commissioners appointed March 29, 1870.

COMMISSIONERS OF FISH AND GAME.

Term expires.	Name.	Residence.
1896	George Pfeiffer, Jr., Chairman	Camden.
1897	Robert D. Foote, Secretary	Morristown.
1895	Parker W. Page	Summit.

NEW MEXICO.

Has no Fish Commission as such. The legislative act approved February 14, 1889, entitled "An act to provide for the protection and propagation of fish" provides that the Governor shall "appoint fish wardens in each county of this territory who shall hold their office during the pleasure of the Governor." Under this act, forty-four wardens have been appointed.

NEW YORK.

First Commissioners appointed April 22, 1868.

Name.	Residence.
L. D. Huntington, President	New Rochelle.
W. H. Bowman	Rochester.
A. Sylvester Joline	Tottenville.
D. G. Hackney	Fort Plain.
Robert Hamilton	Greenwich.

NORTH CAROLINA.

First Superintendent of Fisheries appointed April 2, 1877.
No return.

NORTH DAKOTA.

First Commissioners appointed in 1893.

Name.	Residence.
W. W. Barrett	Lakota.

OHIO.

First Commissioner appointed May 3, 1873.

Name.	Residence.
H. B. Vincent, President	McConnellsville.
J. H. Newton	Newark.
W. R. Huntington	Cleveland.
John H. Law	Cincinnati.
B. F. Seitner, Secretary	Dayton.

OKLAHOMA.

No return.

OREGON.

First Commissioners appointed April 1, 1879.

Term expires.	Name.	Residence.
March, 1893	R. C. Campbell	Rainier.
	F. C. Reed, President	Astoria.
	George T. Myers	Portland.

PENNSYLVANIA.

First Commissioners appointed April 15, 1866.

Term expires.	Name.	Residence.
July 15, 1895	Henry C. Ford, President	Philadelphia.
July 15, 1895	H. C. Demuth, Treasurer	Lancaster.
July 15, 1896	John Gay, Secretary	Greensburg.
July 15, 1896	Fred. W. Ebel	Harrisburg.
July 15, 1894	S B. Stillwell, Corresponding Secretary	Scranton.
July 15, 1894	Louis Streuber	Erie.

RHODE ISLAND.

First Commissioners appointed in 1868.

Commissioners of Inland Fisheries.

Term expires.	Name.	Residence.
June 17, 1895	J. M. K. Southwick, President	Newport.
June 20, 1895	William P. Morton, Secretary	Johnston.
June 20, 1895	Henry T. Root, Treasurer	Providence.

Commissioners of Shell-Fisheries.

April 22, 1894	James C. Collins, Commissioner and Sec.	Providence.
April 22, 1894	James M. Wright, Asst. Commissioner	Foster Centre.
April 22, 1894	George C. Cross, Asst. Commissioner	Charlestown.

SOUTH CAROLINA.

First Superintendent of Fisheries appointed December 23, 1878.
No return.

SOUTH DAKOTA.

Has no Commission.

TENNESSEE.

First Commissioners appointed January 14, 1877.

A law approved April 8, 1893, provides for the appointment, by the justices of the several County Courts, at the April term of the Courts, of a "County Commissioner of Fish" for each county.

TEXAS.

First Commissioner appointed September 26, 1879.
Has no Commission now.

UTAH.

Action regarding fish-culture dates from 1871.

Term expires.	Name,	Residence.
Jan. 1, 1896	A. Milton Musser	Salt Lake City.

VERMONT.

First Commissioners appointed in 1865.

Term expires.	Name.	Residence.
Dec. 1, 1896	John W. Titcomb	St. Johnsbury.
Dec. 1, 1896	C. C. Warren	Waterbury.

VIRGINIA.

First Commissioner appointed in April, 1874.

Name.	Residence.
*John T. Wilkins, Jr.	Bridgetown.

WASHINGTON.

First Commissioner appointed November 9, 1877.
No return.

WEST VIRGINIA.

First Commissioner appointed June 1, 1877.

Term expires.	Name.	Residence.
April 17, 1894	C. S. White, President	Romney.
April 17, 1894	F. J. Baxter, Treasurer	Sutton.
April 17, 1894	H. C. Prickett, Secretary	Ravenswood.

WISCONSIN.

First Commissioner appointed March 20, 1874.

Term expires.	Name.	Residence.
April 1, 1897	E. E. Bryant, President	Madison.
April 1, 1897	A. V. H. Carpenter	Milwaukee.
	Richard Valentine	Janesville.
	George F. Peabody	Appleton.
April 1, 1898	Calvert Spensley, Secretary and Treas.	Mineral Point.
April 1, 1898	J. J. Hogan	LaCrosse.
	The Governor, *ex-officio*.	

WYOMING.

First Commissioner appointed December 13, 1879.

Term expires.	Name.	Residence.
Jan. 7, 1895	Gustave Schnitger	Laramie.

* *Ex-officio*, Shell Fish Commissioner.

UNITED STATES COMMISSION OF FISH AND FISHERIES.

(Authorized by Act of Congress, approved February 9, 1871.)

*Commissioner.
Marshall McDonald, Washington, D. C.

Chief Clerk.
Herbert A. Gill.

Division Assistants.
Richard Rathbun, inquiry respecting food fishes.
Tarleton H. Bean, fish culture.
H. M. Smith, inquiry respecting statistics, methods and relations of the fisheries.

Fish Cultural Stations.
Green Lake, Maine, E. M. Robinson, Superintendent.
East Orland, Maine, Charles G. Atkins, Superintendent.
Gloucester, Mass., E. F. Locke, Custodian.
Wood's Holl, Mass., John Maxwell, Superintendent.
Battery Island, Havre de Grace, Md., W. de C. Ravenel, Superintendent.
Bryan's Point, Potomac River, Md., S. G. Worth, Superintendent.
Central Station, Washington, D. C., S. G. Worth, Superintendent.
Fish Ponds, Washington, D. C., R. Hessel, Superintendent.
Wytheville, Va., George A. Seagle, Superintendent.
Put-in-Bay, Ohio, J. J. Stranahan, Superintendent.
Northville, Mich., Frank N. Clark, Superintendent.
Alpena, Mich., Frank N. Clark, Superintendent.
Quincy, Ill., S. P. Bartlett, Superintendent.
Duluth, Minn., S. P. Wires, Superintendent.
Neosho, Mo., W. F. Page, Superintendent.
Leadville, Colorado, H. D. Dean, Superintendent.
Baird, California, Livingston Stone, Superintendent.
Ft. Gaston, California, Capt. W. E. Dougherty, U. S. A., in charge.
Clackamas, Oregon, W. F. Hubbard, Superintendent.

Stations Authorized, but not yet Established.
New York, on or near St Lawrence River.
Vermont, St Johnsbury.
Texas, San Marcos.
Montana, Bozeman.

*At pleasure of President.